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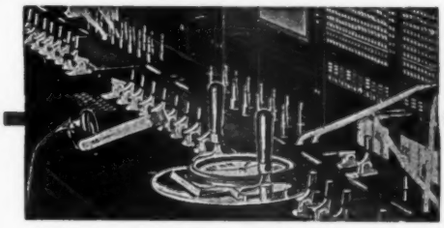

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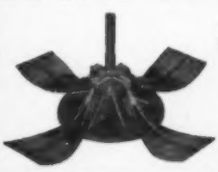

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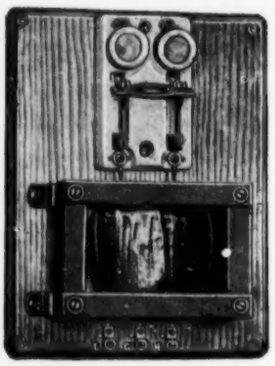

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Telephony.

THE AMERICAN TELEPHONE JOURNAL

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The First Step.

Probably it would be quite within the truth to say that Postmaster General Burleson has 8,000 fewer critics today than he had ten days ago.

The reason is that since then he has released, under certain conditions, 8,000 class "D" telephone companies from government control and turned them back to their owners. By just that much he has won the commendation of those whose properties are set free.

Most of the adverse criticism of Mr. Burleson among telephone men has come from the smaller operators, and his action in releasing the class D companies will meet their general approval. That this will be a preliminary step to the turning back of all the lines to private operation is generally believed, for even if the Postmaster General does not voluntarily extend the release, it is expected that the new Congress will enact legislation to enforce this action soon after it opens the approaching extra session.

Just what form this legislation will take, it is too early to say, but it is expected it will include or provide some phase of federal regulation that will afford telephone companies rate protection under the harder conditions the war has produced. This applies especially to the larger companies which have experienced uncomfortably big wage increases.

Smaller companies have not been so seriously affected by higher wages, but the cases of many of the larger utilities are like unto that of the railroads which hope to go back to private control but do not want to go back until they are assured rates that will enable them to meet increased costs, operate their lines and not starve to death financially.

Many telephone companies have been granted higher rates since government control went into effect last August. These increases were deserved—and others should be granted—for, while prices have soared in nearly every line since the big war began in 1914, the last to share in the upward trend has been the public utility. Telephone companies, as well as railroads, should be assured living compensation, and many believe a form of regulation can be devised whereby the federal government will insure adequate telephone rates as well as adequate railroad rates.

If the ultimate outcome of Washington's interference with the telephone industry is a sane, effective method to insure adequate rates for operating companies, the experience of the last eight months will not have been in vain. So far as his treatment of the companies is concerned, justice compels the statement that Mr. Burleson has not withheld his approval of better rates, no matter what his reasons may have been.

Recurring to the government ownership issue, it is interesting to note that Congressman Aswell, (Democrat) of Louisiana, who introduced the resolution that authorized the seizure of the wires, is so disgusted with the results that he says he desires to apologize to the people for furthering that measure. It seems that Mr. Aswell believed his resolution would lead to a general reduction in rates, and that the people would hail him as their deliverer. Rates have gone up, and now he is seeking cover.

"This means the death knell of government control or ownership of telegraph, telephone and railroad lines," he says. "I owe it to my people and to Congress to apologize for my resolution if government control means increase in rates."

No doubt the American people will manage to exist whether the Louisiana congressman expresses his penitence in an apology or not. What the public wants is efficient and adequate telephone service, and thinking men know that a living rate must be granted the companies if they are to furnish it.

The period of government control has emphasized that need in a very effective way and the advance made in that direction should be utilized in crystallizing a plan to guarantee the payment of sufficient compensation. Furthermore, events of the past eight months have turned public attention more to wire service than ever before. Its importance is better appreciated, and the needs of the business are better understood.

Real benefits, therefore, should be inherited by the industry by reason of the period of government operation. Close association breeds sympathy and understanding, and the telephone business should profit eventually by what officialdom has learned of its needs since last August.

The Release of Class "D" Companies

Order of Postmaster General Makes Optional Acceptance by Smaller Companies of Relcase from Government Control—Direct Control May Be Again Obtained by Companies—Conditions Intended to Protect All Companies

As announced in last week's issue of TELEPHONY, the class D telephone companies were released from government control on April 9, under certain conditions set forth in the order which is published in full on this page.

In the statement which precedes the Postmaster General's order in Bulletin No. 23, the class A, B and C companies are assured of the intention of the Postmaster General to proceed as rapidly as possible in the making of compensation contracts.

The conditions imposed in the first clause not only are designed to prevent a class D company from needlessly paralleling another company's lines but also protects it from being paralleled by lines of other companies. The other classes of telephone companies are also protected by this clause.

Without this clause many class D companies, after they were released, could proceed and parallel lines of companies under government control, and at the same time have a greater leeway with regard to their rules and regulations. They, therefore, might damage the class C and also class B companies whose systems are made up of several exchanges which, if they were separate, would be class D properties.

The general desire of the class D companies so far as the U. S. Telegraph & Telephone Administration could ascertain, was to have their properties released. The intention of order No. 2980 is to release them and give them the greatest freedom not inconsistent with the protection of the property not released, and where conditions were imposed, to make only such conditions as would actually result to the financial benefit of the class D companies. It can safely be assumed that if this order as now drawn does not work out to that end, such reasonable changes will be made in it from time to time as will accomplish that end.

There is, of course, great difficulty in issuing a general order dealing with the various companies whose interests may in some respects be different. Generally speaking, the interests of the class A, B, C and D companies are all the same but there are specific instances where they are not. That is where the difficulty of issuing a general order arises.

The history of the toll rate order No. 2495, which was modified so as to remedy certain injustices that developed in the cases of companies operating under unusual conditions, is evidence of the fact that those in authority desire to do the right thing but that it is not always possible to get up a general order in the first instance so that it will take care of every possible condition.

If developments indicate that any modifications of the order releasing the class D companies, are desirable, the matter should be taken up with General Supervisor F. B. MacKinnon, 521 Colorado

Telegraph and Telephone Service, Bulletin No. 23.

The Postmaster General has this day issued an order authorizing Class D telephone companies to operate their properties with the maximum freedom from federal supervision under conditions intended to secure to their owners full possession and control of the revenues derived therefrom. At the same time, he announces the intention of the wire control board to make compensation contracts with Class A, B, and C companies as rapidly as possible. Every effort will be made to complete this task at the earliest possible date.

The order reads:

Office of the Postmaster General.

Washington, D. C., April 9, 1919.

Order No. 2980: Unless and until otherwise ordered by the Postmaster General, telephone companies, including individuals and partnerships, whose gross revenues do not exceed $10,000 per annum, for which no form of accounts has been prescribed by the Interstate Commerce Commission, and which make no reports showing the financial condition of the business (that is, companies operating telephone systems falling within Class "D," I. C. C. classification), are authorized to operate and manage their properties free from direct federal supervision, under license, upon the conditions following:

1. No company so licensed shall hereafter construct any lines or system parallel to or duplicating the lines or system of any other company without the approval of the Postmaster General, and if any company undertakes to parallel or duplicate the lines or system of a company so licensed, the latter shall report the facts to the Postmaster General.

2. Each company so licensed shall collect the service connection and other charges specified in order No. 1931 as modified by order No. 2352, and the toll rates specified in order No. 2495 as modified by order No. 2797; and

3. Each company so licensed shall put into effect, when required by the Postmaster General, any future orders he may issue with respect to such licensed companies.

4. Each company so licensed shall retain for its own use its gross operating revenues and shall pay all its operating expenses.

5. The acceptance of the license herein provided for by a Class "D" company shall operate as a waiver to any claim it may have for compensation under the joint resolution of July 16, 1918, for the use of its lines or systems during the entire period of government control, subject, however, to the cancellation of its license on 30 days' notice from the Postmaster General in case of failure of the licensee to observe its terms, or in case the particular telephone property becomes necessary for public uses or purposes.

6. If for any reasons any Class D company feels that its interest requires its continuance under direct federal supervision, it shall notify the Postmaster General within 30 days from the date of this order, and all companies not filing such notification shall be presumed to have accepted and become licensees and to be bound by the terms and conditions herein set forth. Any such licensee company may, upon 30 days' written notice to the Postmaster General, have its license cancelled and thereupon restore the status existing prior to the date of this order.

7. If and when a Class D company increases its annual gross revenues above $10,000, it shall notify the Postmaster General.

(Signed) A. S. BURLESON, Postmaster General.

Bldg., Washington, D. C. It should be particularly noted that no class D company is required to accept its release. from government control.

Any company can remain under government control, or if it prefers, can accept the release and then if it finds conditions are such that government control is preferable, can return to it upon 30 days' notice.

In sending out copies of the order to members of the United States Independent Telephone Association, Vice-President F. B. MacKinnon says:

"The order releases under a license class D telephone companies from direct federal supervision, except that the companies so licensed are to refrain from constructing any lines paralleling or duplicating the lines of other telephone companies; are to collect the service connection charges and standard toll rates; and are to obey other future orders directed to the licensed companies.

The companies which accept this license are to waive all claims for a compensation and to accept their earnings as compensation. The order, therefore, in effect fixes the compensation of all of the companies that accept the license and thereby agree to its terms. Any company which does not want to take advantage of this license and compensation arrangement must notify the Postmaster General within 30 days from the date of the order, otherwise the company will be presumed to have accepted the license and be bound by its terms. The license can be cancelled upon 30 days' notice, either by the Postmaster General or the licensee company.

As the representative of the association, I have urged the issuance of this order, provided that at the same time it was issued the Postmaster General should proceed as expeditiously as possible to enter into compensation agreements with all class A, B and C companies desiring the same. This the Postmaster General has announced he will do. Therefore, all companies in those classes desiring compensation agreements should so notify the Postmaster General immediately.

It is my belief that the issuance of this order will clarify the situation and relieve the managers of the class D companies who have felt that they were being restrained and unable to transact their business to the best interests of their companies.

By the terms of the order, the class D companies are now free to adjust their rates according to the laws of their state the same as they adjusted them prior to August 1, 1918. The D class companies are free to carry on their regular financial operations, make extensions to their property except those parallelling the lines of other companies without submitting such matters to the Postmaster General for approval.

By the terms of the order prohibiting the parallelling of other systems, all classes of companies are protected and benefited. By the requirement that licensed companies shall collect service connection charges and standard toll rates, the class A, B and C companies are protected in their collection of those charges."

Famous Central Union Suit Settled

Through Agreement of Attorneys, Receivership of Company Brought About by Action of Minority Stockholders Is Terminated and Property in Three States Is Restored to Control and Management of the Bell System

On April 8 the case of William A. Read, et al. vs. the Central Union Telephone Co., was settled.

The American Telephone & Telegraph Co., and its officials, removed from control of the Central Union Telephone Co., by Judge William E. Dever in the Superior Court at Chicago in 1917, were restored to power on April 11 by the Appellate Court at Chicago. The order, entered by Justice John M. O'Connor, by agreement of attorneys, discharges the receivers and ends litigation pending for six years.

Property of the Central Union Telephone Co., in Indiana was ordered turned back to the company from the hands of receivers, appointed more than five years ago, at Indianapolis last week, when attorneys representing minority and majority stockholders appeared before Judge W. W. Thornton, in the Marion County Superior Court, and asked that the receivers be discharged.

Following the issuance of the order, Judge Thornton discharged Edward H. Schmidt, receiver for the company, who was appointed in that capacity in January, 1918, after John A. Moriarity, appointed receiver by Judge Charles J. Orbison in 1914, retired from the position because of ill health.

The action in the Marion county court followed the discharging of receivers for the company in Illinois. Similar action will be taken in Ohio, it is understood, where a receiver was appointed at the same time the Indiana and Illinois receivers were named.

After Judge Thornton's order was issued, the Central Union Telephone Co., filed with the Indiana Public Service Commission a petition to take over from its recently-discharged receivers all stocks, bonds and notes of other companies in Indiana in which the company previously had an interest or in which the receivers acquired an interest for it within their period of jurisdiction.

Accompanying the petition was a summary of the holdings of the company in Indiana. It shows that the company holds securities amounting to $1,312,731.30 in 14 Hoosier telephone companies. The holdings are distributed as follows:

Stocks in 13 companies amounting to $683,263.30; bonds in seven companies, one of which is a company in which the Central Union owns no stock, $262,000; notes of three companies, $367,468.

The holdings named in the summary are as follows:

Citizens Telephone Co. of Columbus, $25,000 stock, $28,000 bonds; Citizens Telephone Co., Kokomo, $150,000 stock, $60,000 notes; Citizens Telephone Co. of Clay county, Brazil, $20,000 stock, $19,500 bonds; Converse (Ind.) Telephone Co., $7,600 stock; Farmers and Citizens Telephone Co., of Franklin, $7,680 stock; Co-operative Telephone Co., of Portland, $11,750 stock; Garrett (Ind.) Telephone Co., $15,000 stock, $25,000 bonds.

Indiana Telephone & Telegraph Co., of Indianapolis, $35,000 stock, $46,500 bonds; Merchants Mutual Telephone Co., of Michigan City, $50,550 stock; New Home Telephone Co., Bloomfield, $26,033.30 stock, $67,500 notes; Parke County Telephone Co., of Rushville, $25,350 stock; Sullivan (Ind.) Telephone Co., $300 stock, $21,300 bonds; United Telephone Co., of Bluffton, $300,000 stock, $101,000 bonds, $239,968 notes; and Lebanon Telephone Co., $20,700 bonds.

This suit for receivership was started in Illinois six yeare ago by William A. Read and other minority stockholders of the Central Union company and subsequently A. A. Beebe, Ernest M. Kimball, Frederick W. Schwamb and other Chicago stockholders intervened in the proceeding as co-complainants. The defendants in the suit were the American Telephone & Telegraph Co., the Central Union Telephone Co. and all of its officers and directors. The Western Electric Co. was also made a party to the proceedings.

The original suit was a petition for an injunction to restrain Theodore N. Vail, Bernard E. Sunny and other offi-

cials from selling the stock in the Central Union company to the American Telephone & Telegraph Co.

Subsequently the stockholders filed a bill seeking a receiver, charging officials of the American Telephone & Telegraph Co. with a deliberate plot to wreck the Central Union company and resorting to "trust" methods.

The capitalization of the Central Union Co. was $10,000,000. The outstanding stock is approximately $5,300,000. Of this amount, William A. Read, Charles J. Spencer and Charles G. Foster owned $100,000 par value of the stock. The rest of the stock was owned by the American company.

The complainants charged that indebtedness of $32,000,000—since increased by interest to $45,000,000—was piled up against the Central Union company by exorbitant and unauthorized charges and high prices for equipment. It was further charged that the Central Union company was compelled to bear the brunt of the fight against the Independent companies in the Middle West, when the campaign was waged at the direction and in the interest of the Bell system.

Five years ago Judge William E. Dever, of the Superior Court of Cook County, Ill., appointed David B. Forgan, Edgar S. Bloom and Frank F. Fowle as receivers to take charge of the Central Union company in Illinois. Receivers were also named by Indiana and Ohio courts for the company in those states.

On January 20, 1917, Judge Dever rendered an opinion in the case in which he held that the stock of the American Telephone & Telegraph Co. in the Central Union company was null and void. He also ordered an accounting and held that the American company could not recover any part of its alleged indebtedness from the Central Union company until after a full accounting.

In his decree, which was issued July 10, 1917, Judge Dever ordered all stock held by the American Telephone & Telegraph Co. in the Central Union Telephone Co. to be sold at public auction, the A. T. & T. Co. and all parties connected with it being prohibited from bidding for, or buying in, this stock.

The settlement effected last week thus ends one of the notable cases in telephone history. It is stated that the settlement is satisfactory to the minority interests which instigated the suit—and the Bell interests have undisputed control of the Central Union properties.

Three Judges Uphold United States Telephone Rate.

Three federal judges held on April 14 that the state of Illinois had no right to interfere with the federal government's order that raised telephone and telegraph rates. The decision temporarily enjoins the state from enforcing Judge Foell's order of April 9 estopping Postmaster General Burleson from putting the new rates into effect. Federal Judges Baker, Page, and Landis, sitting en banc in the United States District court, granted a temporary restraining writ prohibiting the state authorities from interfering with the new schedule.

Judge Landis will sit alone in hearing the arguments on April 21, preceding a final court order.

The rates which the federal government seeks to enforce are those covering toll and telegraph messages recently put into effect by the Postmaster General. Since then Attorney General Brundage, appearing for the Illinois Public Utilities Commission, has battled against their being put into force, claiming the congressional resolution providing for taking over the telephone and telegraph lines did not grant rate-making power, as this is included in the state's "police power" which is recognized in the act.

The government forces indicated that there is anxiety to rush the case, the first to be started by federal authorities against state officials, to a conclusion so that the supreme court can pass on the matter and establish the exact status of the war legislation.

Only last week Judge Foell in the Superior Court held that the state was supreme in the fixing of rates and that the government was attempting to usurp "police powers." Acting in this belief, he issued an injunction prohibiting the enforcement of a 20 per cent increase in telephone rates. The telegraph case involves the same contentions as in the telephone case.

The telegraph case came up before Judge Landis a week ago, when the jurist restrained the state authorities from starting suit or otherwise interfering with the government rates.

Government Urges United States Supreme Court Action.

The government filed a formal motion on April 12 asking the United States Supreme Court to hear arguments at this term on the appeal brought by the government from the South Dakota Supreme Court decree denying Postmaster General Burleson's authority to increase telephone rates and enjoining four telephone companies in that state from complying with an order issued by him last January 21, increasing toll rates. South Dakota authorities concurred in the motion.

While two other cases involving the validity of the Burleson order have reached the court, this is the first direct appeal taken, and the government plans to make it a test case.

In asking early consideration of the case, the government in its brief, said that the situation growing out of the issuance of the injunction not only was producing financial loss, but was greatly embarrassing the Postmaster General in the administration of the telephone lines.

"The question presented in this case," the brief said, "has arisen in suits filed in a number of other states with the result that in Florida, Indiana, Illinois, Minnesota, Missouri, Nebraska, Ohio, Pennsylvania and Michigan, the decision has been against the power claimed by the Postmaster General, while in the federal courts of Florida, Indiana, New Jersey, and North Dakota, Louisiana, Massachusetts, and Oklahoma, decisions have been rendered in his favor. Injunction proceedings are pending in Georgia, California, New York, Texas, Nebraska, Indiana, Wisconsin, North Dakota and Mississippi.

Ohio State Carries Toll Controversy to Supreme Court.

The Ohio State Telephone Co. appealed to the Ohio Supreme Court, April 1, from the decision of the lower courts in which the company was restrained from charging the higher rates authorized by Postmaster Burleson for telephone service.

In the petition, the company holds that Burleson was in his rights as agent of the President in boosting rates. The petition holds that the President has power in time of war to seize, operate and fix rates of telephone companies.

Ruling Promises Five-Cent Telephone Calls to Suburbs.

The Illinois Supreme Court on April 15 reversed an order of the Sangamon County Circuit Court setting aside the Illinois Public Utility Commission's order to the Chicago Telephone Co. to file a schedule of its rates. The original order was obtained by Attorney Myer J. Stein, who said Chicago suburbs were discriminated against by the telephone company.

"The order," says the court, "made by the commission was only an interlocutory order made in the progress of the hearing on the petition and no appeal lies from it. The circuit court should, therefore, have dismissed the appeal."

The decision is a victory for Mr. Stein and the utilities commission. It reaffirms the rule that utilities are subject to the commission's directions.

Burleson Intrastate Rates Enjoined in South Dakota.

In a divided opinion, 3 to 2, handed down March 24, the South Dakota Supreme Court granted the application of the state railroad commission for an injunction restraining the telephone companies of the state from putting into effect the new higher telephone rates fixed by Postmaster General Burleson, in so far as they affect intrastate business.

Recent Radio Development Work

Extracts from Address Before American Institute of Electrical Engineers by Maj. Gen. George A. Squier on Subject of "Aeronautics in the United States"—Vacuum Tube Development and Radio Telephone and Telegraph Sets

In the question of the engineering achievements of the Signal Corps during the war, the development of radio apparatus forms a large part. Inasmuch as the vacuum tube occupies so prominent a role in almost every kind of radio apparatus, an outline of its development logically precedes discussion of the radio sets.

The application to radio intercommunication of the vacuum tube—perhaps more properly called the thermionic tube or bulb—is one of the most interesting developments in the whole field of applied science. Not only has it made possible what has been justly heralded as one of the most spectacular achievements of the whole war—the airplane radiophone—but the confidence growing out of the extensive experience with the vacuum tube in warfare, coupled with its extreme adaptability, have resulted in a rapidly-increasing amount of radio development involving its use.

The Vacuum Tube.

The vacuum tube was known in various forms before the war. Following extensive experiments with the so-called "Edison effect," Fleming, some years ago, produced the well-known Fleming valve—a current-rectifying device, capable, therefore, of being used as a detector of radio signals. This device contains two elements: An incandescent filament emitting electrons, and a plate upon which an alternating voltage is impressed, both placed within an evacuated bulb.

Later Dr. Lee deForest introduced an important modification by placing a wire mesh or "grid" between the filament and the plate. A small voltage variation on this grid produces the same current change through the tube as would a much larger voltage variation on the plate, thus adding amplifying properties to the detector characteristics of the Fleming valve. DeForest called his device the "audion."

Later, with superior facilities for evacuation available and with a more intimate knowledge of the laws of thermionic emission from hot bodies, improvements and modifications were made in the audion or vacuum tube by both the General Electric Co. and the Western Electric Co., the latter designating its product as "vacuum tube," and the former the "pliotron."

In addition to acting as detectors and amplifiers, as mentioned above, vacuum tubes can function in two other important ways:

1. As oscillators. In properly designed circuits containing inductance and capacity, they will act as radio frequency generators, for use in transmitting or receiving radio signals.

2. As modulators. By suitable connection to an oscillator circuit or antenna, they can be made to vary the power radiated so that the envelopes of the waves transmitted shall have any desired wave form, as for example, the speech waves from an ordinary telephone transmitter.

The most striking use made of vacuum tubes prior to the time we entered the war was the transmission of speech by radio from Washington to Paris and Honolulu, during the experiments carried out by the American Telephone & Telegraph Co. and the Navy Department. Vacuum tubes were used as the radio frequency generator for transmitting, and for detector and amplifier in receiving.

When the United States entered the war, vacuum tubes already were in use by the Allied forces for various signaling purposes. The French particularly had been quick to recognize the military value of vacuum tubes and had, previous to June, 1917, developed very creditable tubes and apparatus. In America, tubes were in limited use as "repeaters" on telephone lines, and as detectors and amplifiers in laboratories and radio stations. The total production, however, in this country did not exceed 300 or 400 a week.

Early in our participation in the war, it became evident that vacuum tubes would be required in very large quantities in order to meet the growing demands for radio communication and signaling. It was equally evident that service conditions, not hitherto anticipated, would require great mechanical strength, freedom from disturbance under extreme vibration, and uniformity of product sufficient to make possible absolute interchangeability of the tubes in sets, without the necessity of readjusting when changing tubes. To these conditions must be added that of minimum size consistent with dependable operation.

Difficulties of Production.

To make such a device, with its complicated, yet accurately constructed metallic system, within a practically perfect vacuum, is no small problem even when made in the laboratory, on the individual unit basis by a skilled operator who appreciates the delicacy of the job. To turn out tubes by the thousands by factory methods involves almost infinitely greater difficulties. How well certain companies, in collaboration with the Signal Corps, have succeeded in solving these difficulties is indicated by the fact that recently the total rate of production in the United States of high-quality standardized tubes was considerably in excess of one million a year. This rate of production could be made many times greater on short notice.

Securing Proper Vacuum.

As an example of the difficulties which this quality production has involved may be mentioned that of evacuation. The degree of vacuum required is such that unusual methods of exhaust are necessary. The heating of the tubes in electric ovens is supplemented by heating of the elements of the tube by excessive filament and plate electrical power input. Molecular pumps are employed, necessitating an extremely large number of pumps to handle quantity production. Special treatment of metal parts prior to assembly is employed to reduce the gas given off by them during the exhaust process.

Another problem is that of making the complicated metallic structure of all tubes exactly alike, in order to insure identical electrical properties. As an indication of progress in this direction, it may be stated that one company is prepared to manufacture, in quantity, a certain tube in which the clearance between filament and grid is only 3/100ths of an inch, the allowable variation being of course only a small percentage of this.

Tubes developed by the Signal Corps may be divided into two general classes: The tungsten filament types as developed and manufactured by the General Electric Co. and the DeForest Radio Telephone & Telegraph Co., and the coated filament or Wehnelt Cathode types as developed and manufactured by the Western Electric Co. The coated filament the advanced "firing line" of so-called pure physics, and applied engineering.

The Airplane Radiophone.

Prior to April, 1917, a few experiments had been made, in which speech had been transmitted from airplane to ground by radio methods, but the apparatus involved was hopelessly crude. On May 29, 1917, the Chief Signal Officer called a conference in his office at which the project of evolving a "voice command" equipment for airplanes, which should meet all the severe requirements of the military service, and which should be thoroughly standardized for quantity production, was definitely set in motion against time.

The present airplane radiophone, therefore, is the result of a period of intensive development work begun shortly after we

entered the war. The services of the Western Electric engineers were enlisted, and under the direction of the Signal Corps, rapid development resulted in successful tests as early as August, 1917. Speech was exchanged between airplanes 25 miles apart in October, and sample sets were sent at once to the army in France for trial. Several thousand sets were ordered and have been completed and distributed to flying fields here and to the Air Service in France.

The satisfactory performance of this apparatus has resulted in a new type of military unit known as a voice-commanded squadron. The commander of an air fleet directs the movements of the individual units in any manner desired; the effectiveness of the squadron as a military machine is thereby enormously increased.

Elements of Airplane Radiophone.

Other uses are in communicating information from airplanes to ground stations, and in directing one or more airplanes from a ground station. Innumerable applications will be evolved as the possibilities are realized.

The essential elements of the airplane radiophone are the power equipment, the radio equipment, and the antenna.

a. The power equipment includes a double-voltage direct-current generator driven by an air fan, with a vacuum tube voltage regulator.

b. The radio equipment consists of the vacuum tube transmitting and receiving set, and the special telephone transmitters and receivers. Those who have heard the terrific roar of a Liberty engine will realize the difficulty of talking in an airplane in flight. The development of a transmitter which is affected by the human voice, and not by the enormously greater engine and wind noises, is one of the principal features of this set. Similarly, to shield the ears of the aviator from the same noises required a special combination of sound-insulating materials surrounding the telephone receivers and suitable for use within an aviator's helmet.

c. The antenna originally consisted of a flexible copper wire several hundred feet long, unreeled by the aviator and trailing almost horizontally behind the airplane. Modified antenna using much shorter wires fixed to the framework are now used.

The operation of the sets is extremely simple, all adjustments being made before leaving the ground. The only manipulation required of the aviator is that of the change-over switch to change from talking to listening.

Use of Radio.

The principal use of radio communication made during the war was in sending radio telegraph signals from observation airplanes, for controlling artillery fire. The French developed a set which consisted of several units, making the installation and operation complicated. The Signal Corps developed a self-contained set, which has been demonstrated to be far superior to any other airplane set.

It consists of three units—first, the 200-watt, 900-cycle alternator, driven by a regulating air fan, and containing in a stream line case attached to the generator, all the elements of the radio set. This radio apparatus is of the synchronous spark type, with four spark tones and nine wave lengths. The weight of the complete unit is only 23 pounds, and size only six ins. by six ins. by 26 ins. The regulating air fan maintains the speed of the generator within 4 per cent of 4500 r.p.m., with air velocities between 60 and 200 miles an hour.

The remaining units in the complete set are a variometer or tuning coil, with antenna ammeter attached, and the antenna system, comprising a reel, insulated bushing, and training antenna. When it is realized that voltage of 30,000 or more is produced by this set, the difficulties of insulation in such restricted spaces will be appreciated.

Ranges of communication of 100 miles have been accomplished with this set.

One of the principal problems of airplane navigation has been the evolution of a suitable compass, particularly for tubes so far have proven superior to the tungsten filament tubes for Signal Corps use. Both classes have been standardized as regards base, exterior dimensions, filament current and voltage, and in addition, plate voltage and output for transmitting tubes; and amplifying power and detecting power for receiving tubes. Except in certain special cases, the Signal Corps uses two types of tubes, one for transmitting, and another for receiving. The French and the British have been using one type for both transmitting and receiving, but present tendencies of the British are toward different tubes for different duties.

Vacuum Tubes.

Vacuum tubes are now employed for electric wave detection, radio frequency and audio frequency amplifications, radio telephony particularly in the airplane radiophone, continuous wave radio telegraphy, voltage and current regulators on generators, and for other miscellaneous purposes.

However, varied as are the applications at present, the uses, actual and potential, growing out of war development work have proved that the art of vacuum tube engineering, and the application of its products to radio engineering, telephone and telegraph engineering, and particularly to electrical engineering in general, are still in their early infancy. That vacuum tubes in various forms and sizes will, within a few years, become widely used in every field of electrical development and application is not to be denied.

Possibilities for Telephone Expansion in Brazilian Cities.

In Brazil there are a number of telephone companies, some of which are provided now with modern equipment, although most of the smaller ones will be in need of new material to take care of natural expansion. The more important companies are located in Rio de Janeiro and Sao Paulo and are owned by the Brazilian Traction, Light & Power Co. They have about 40,000 subscribers and use American material. This yearly increase is approximately 10,000 instruments in service.

In Chile the two largest stations are in Santiago and Valparaiso, and since they are owned by German capital, their whole influence has been used to exclude material other than that of German manufacture.

There are several smaller Independent telephone companies, but most of the more important places are controlled by the Chile Telephone Co., an English concern with headquarters in Santiago. It is preparing to replace much of the older equipment with more modern material.

In Argentina a large number of small telephone companies operate in the various towns and cities and have a total of approximately 50,000 subscribers. The better organized companies are using American material, especially the Union Telephone Co. of Buenos Aires, which has installed modern and up to date equipment.

In Uruguay, the telephone companies, of which there are approximately 20, are now owned privately, but the government intends to take them over, under its policy of declaring all public utilities to be state monopolies. There are approximately 18,000 instruments in use, of which 10,000 belong to the two companies operating in Montevideo. The larger of these, an English company, with 8,000 subscribers, uses American material.

President to Talk From Ship to Capital by Wireless.

When the George Washington clears from Brest for the United States with President Wilson aboard she will have installed in her wireless room a telephone transmitter which will permit the President to hold wireless conversation with the navy radio station at New Brunswick, N. J., and possibly with Washington direct. This will be made possible by the use of the General Electric Co's apparatus designed by Dr. Ernest F. W. Alexanderson.

Wireless telephone messages were sent by this apparatus to the President throughout his last voyage to France, but the steamship was not fitted with the same apparatus and he could not reply in kind. Recent experimental work, however, is believed to have perfected the answering facilities.

Some Experiences of a Troubleman

Shooting Trouble on a Rural Telephone Line—Some Faults Commonly Found and How They Were Cleared—Minimizing Trouble Caused by Proximity of Power Lines—Paper Presented at Canadian Independent Telephone Convention

By Dr. W. Doan

In the early days of my telephone experiences I was manager and trouble-hunter of a rural grounded party line, some 19 miles in length and having thereon 19 telephones. My situation was about in the middle of the line.

One morning about the middle of the forenoon we noticed that the line was out of order. The bells rang very faintly and the crank turned very hard. By separating the line either way from my telephone, I easily located the section the trouble was on. This left me a line of eight miles with about the same number of telephones to inspect.

Invariably I try to impress on our men the necessity of clearing the trouble as they go; that is, take a starting point, which should be at central, and have everything working behind them. This I did by taking each telephone in rotation, as it was attached to the line. As I went to each telephone and inspected, I invariably turned the crank to see if it would ring.

The first one examined would ring but not satisfactorily; the next rang less satisfactorily, so I was sure the trouble was still ahead of me. After calling in several houses and not locating the trouble, I entered the house of one of our subscribers and was met at the door by the man himself, who asked, "What are you doing around here?" I explained that the line was out of order, being apparently grounded.

Unique Cause of Trouble.

He remarked, "There is no use in your bothering about my telephone as it is all right." However, as I was there, I told him I would take a look around and see for myself. On entering the room I found several of his neighbors sitting around having a conference. I went to the telephone and passed my hand along the top of the telephone and found a large key, about four or five inches long. I then turned the handle of the telephone and the trouble was gone.

The laugh was on the subscriber who was so cocksure his telephone was not causing the trouble. What had happened was that when the men came in, they wanted some papers out of an old safe that was locked by this huge key. When the safe was opened this key was laid on top of the telephone, which was equipped with the then-prevailing metal saw-tooth strips on the top. In laying down the key, it had shorted the strips, thus grounding the line. We had another trouble on this same line which eventually proved to be a pin or needle falling or getting in between the saw-tooth plates of the arrester.

One of the difficulties experienced in sending out green men to hunt for trouble is that they cannot see anything smaller than a crowbar.

Classes of Trouble.

As soon as a system becomes large enough to require one or more operators, the troubles of various kinds multiply. The troubles of a rural telephone system operating its own switchboard may be divided into four divisions: 1. Switchboard trouble; 2. Cable and pole cable terminal troubles; 3. Line troubles, and 4. Telephone or instrument troubles.

As all are well aware, it is not always possible to get experienced operators for our boards and green hands always cause more or less trouble. Some time ago it became necessary to employ a new operator at nights at my home-town exchange. The first night he came on duty the board was reported O. K. when he took charge. In about 15 minutes after he had been left alone I thought the whole town must be in the agonies of death from the violent manner in which my door bell was rung.

On going to the door I found our new operator breathless. He thought he had "busted" the whole machine. All the drops were coming down, but he could neither hear nor be heard. He was going to jump the job at once. I went back with him, and what do you suppose was found to be the trouble?

In moving his chair he had partly pulled out the receiver plug. As soon as he was told it would work better by keeping the plug all the way in, the board came to life.

Carelessness on the part of the operators in inserting or removing the plugs often causes poor connections. The plugs should be inserted or removed by the operator grasping the leather or composition ferrule of the plug and not the end of the cord.

In some switchboards there are flat shelves beneath the keyboard. These catch-all places cause more cuss words and troubles than all the rest of the board. No matter how strongly and vigorously operators are cautioned—under penalty of death even—not to use this place, it will almost invariably be found full of all kinds of trash and this, coming in contact with the wires of the key springs, causes the wires to become broken and detached from the keys. The strangest thing about the whole matter is that you can never get any one to admit to unlocking the key-shelf, let alone trying to use it.

On one of our boards we had a trouble that acted somewhat like this: A subscriber would push the button and the drop at central would fall. On plugging in, sometimes the operator could hear the calling party and at other times could get no answer. If, however, the operator would ring back she could then hear well. We had the line gone over for all loose or rusty joints, all fuses and cable terminals examined, and still the trouble was with us.

The trouble was finally located in the back of the board, where we found a resin-soldered joint—a joint that was soldered but not long enough to drive the resin out so that the solder would be attached to both metal points. It had eventually loosened up. A soldering iron did the trick and made it one of our best lines.

In our early days we used wet cells for our switchboards, but the trouble of cleaning and renewing was considered too much bother, so we have been using dry cells in the talking circuit. Our plant is a bridging metallic circuit, local battery. I believe that dry cells in the switchboard are more expensive than the wet cells but not so dirty to look after.

A short time ago an operator at one of our switchboards called me and said she could make no one hear from the transmitter on the board. This call came in about noon and as no one was available to send to clear the trouble I went myself and found the transmitter dead. The transmitter cords tested O. K. but the transmitter refused to work. Upon removing the transmitter from its shell I found that the screw holding the spindle of the button was loose. Upon tightening the screw and re-assembling the transmitter, it worked as well as new.

Cause of Short Circuit.

Another trouble liable to occur is a short circuit when cutting back switchboard cords. This happens when the workman inserts the little screw in the tip end of the plug and, in tightening it, screws it too tight so that it comes in contact with the sleeve of the plug, thus causing a short.

The latter part of last summer we had considerable trouble at one of our exchanges every time it rained. As soon as the storm was on, the transmission would become very bad, with considerable cross talk. It was also impossible to ring signals on lines with seven or more telephones. We inspected the lines and all drop wires but could not find anything.

Crossing of Communication Trenches and Entrance to Dugouts, Showing How Wire Is Carried by Means of Lead-Covered Cable Underground—Signal School, First Depot Division, France.

We were particular about the drop wires, for some time previously we had been using a covered wire which was fine for dry weather, but an excellent producer of crosses in damp or wet weather, and we were afraid that some of this material was still in use.

At last we concluded that the trouble must be in the cable. When we were dismantling the old piece of cable, there must have run out of one end of it two or three quarts of water. When we saw that, we wondered that it had worked at any time. Upon inspection of the sheath of the cable, we found hundreds of small holes in the lead sheath. These little holes were no doubt caused by crystallization of the lead sheath. The span affected was about 160 feet long and crossed the road in a very open place and was thus exposed to all the west and north winds.

With our new cable in place, our troubles all vanished. After electrical storms our main troubles are eliminated as soon as the carbon blocks are well cleaned at both the cable pole terminal and distributing rack. Care must be taken to see that the micas are properly placed between the carbons when being replaced.

Line Troubles.

In years gone by, we used to use the Pony glass double-grooved insulator for transposition purposes. This, however, did not prove satisfactory, as there were too many joints. We now use the large one-piece transposition glass and thus do away with any spliced joints. Transmission is much better and there are no rusty joints to cause a froggy transmission.

Following electrical storms, we have found an open line frequently where we have a right-angle turn, the covered wire used in making this joint being burned completely off. Speaking about electrical troubles, some very strange things happen. We have found, in one instance, the wire completely removed from the covering of a drop wire. Not a particle of the wire could be found, while the troubleman was able to gather up the covering of the wire and bring it back to the office.

In this case, all that was necessary was to replace the drop wire and the telephone worked O. K., no other instrument on the line being affected. Again, after a storm we have found a line open, and on investigation found the line wire melted completely off. As soon as the line was spliced, all worked O. K. Usually most fuses in the cable box blow during the early spring electrical disturbances.

Last spring we had one line that paralleled the Hydro-electric power lines. We were on the same side of the road as they, or rather they built on the same side we were using. This line was very noisy, so much so, especially in the evening or damp weather, as to be almost useless. Our subscribers were complaining and something had to be done. There were a lot of trees along this section that had never been trimmed and were lopping over so as to touch both the power wires and our lines. Imagine what happened when they got wet from a dew or a rain.

We trimmed these trees to our full satisfaction, and I can saythat our line is very much improved and we have received no complaints since the work was completed. When trees are well trimmed they remove a great deal of trouble.

Any money and time spent in repairing the lines, tightening the wires, and reguying any end poles needing looking after, are well spent.

Just the other day one of our men brought in a telephone which he said did not talk satisfactorily. It would talk and then it would not talk, apparently a loose joint—but not so. The trouble was in the transmitter.

Upon taking the transmitter from the shell and removing the bridge, thus releasing the diaphragm, we found packed between the diaphragm and the face of the transmitter ashes from the user's pipe, enough to produce a short. As soon as this was removed and the transmitter reassembled, all was well.

Telephone Revenues Increase In British South Africa.

Telephone revenue in British South Africa during 1917 increased over that of the previous year by $228,788. The revenue returns from long distance telephone service were $198,451 higher than in 1916, notwithstanding an advance in toll rates made during the year, because the rates in force at that time were considered unremunerative. Local telephone officials estimate that revenue amounting to $36,572 was lost during the year owing to shortage of material and apparatus.

Fundamental Principles of the Telephone Business

A Reading Course Designed to Present Logically the Principles Which Underlie Successful Organization and Operation of Telephone Properties—Prepared Under the General Supervision of Stanley R. Edwards—This Section, "Part VII, Telephone Engineering Economics," Written by Chas. W. McKay

[Editor's Note: For several weeks the author of this series, Charles W. McKay, has been ill and it was necessary to discontinue publication for the time being. Mr. McKay has now recovered and we hope to continue the series uninterruptedly.]

Quiz Questions on the Preceding Installment.

38. Outline the method of determining the proper location for a central office or exchange.

39. What determines the ultimate feeder routes and the distribution routes? Discuss the selection of these routes in the illustrative cases presented.

40. How are these groups indicated upon the map, Fig. 3? What factors govern in the choice between alternate streets and the alley method of distribution? Discuss the method of distribution.

41. Discuss the tentative layout of ultimate feeder and distribution routes. Why should provision be made for the utilization of existing plant facilities in these tentative plans?

CHAPTER II. The Development Study (Continued).

42. *Existing facilities and ultimate efficiency.*—As suggested in the previous installment, our present problem has been confined strictly to the design of a telephone plant in virgin territory, a community in which there are no existing telephone facilities. Obviously a problem of this nature is rarely encountered at the present time.

It is, therefore, necessary to modify the tentative layout illustrated in Fig. 4 to include existing plant. Existing telephone feeder and distribution facilities should be utilized insofar as possible. Especially is this true at the present time when the question of material and labor costs is paramount.

In this connection, however, it is well to caution the reader against warping the ultimate layout, at the risk of sacrificing efficiency, to use existing facilities. Where existing pole lines, aerial cables and underground conduit facilities may be used advantageously in connection with the ultimate scheme, it is, as previously suggested, good engineering practice to utilize them to their maximum capacity. On the other hand, it is very foolish to sacrifice ultimate efficiency for the sake of saving a few dollars by using existing inadequate facilities.

43. *Tentative plans and existing facilities.*—Perhaps the best way is to lay out a tentative distribution system in accordance with the method prescribed in the preceding installment, and then note upon this plan the existing feeder and distribution facilities.

It may be found that the existing plant will harmonize with the ultimate layout, or it may be found that by making a slight change in the tentative theoretical layout, existing facilities may be utilized to a maximum degree. However, if the utilization of existing facilities necessitates a sacrifice of ultimate economy, it is far better to junk the present plant and start afresh.

44. *Determining factors of final plan.*—In making a development study, it will be found that there are usually several possible solutions of the problem. The ultimate solution will be dependent upon two factors: First, exigencies of the case under consideration; and second, the cost.

It may be well to make several tentative layouts and estimate the cost of each. In this connection it should be remembered that "cost" involves not only the first cost but also annual cost—or annual charges, to adhere to prevalent telephone parlance. The first cost and annual charges should be computed for each of the tentative schemes under consideration.

Other things being equal, the scheme that involves the lowest first cost and the least annual expenditure for upkeep, will, in the long run, prove the most desirable.

This whole problem, as discussed in the foregoing paragraphs, refers especially to multi-office exchanges.

The various plans prepared should be considered with the utmost attention to detail. They should be compared one with another, and it may frequently happen that all of the original plans will be abandoned—due to the fact that a new and better tentative scheme suggests itself.

45. *Items of annual charges.*—The determination of annual charges involves a consideration of five distinct items:

(1) The cost of subscribers' lines, including cost of poles, aerial cable, line and drop wire, subway and underground cable. Of course, all of these items may not enter into the solution of the specific problem.

(2) Cost of trunk lines, subway, and cable.

(3) Cost of switchboard and central office equipment.

(4) Rental or annual charges on company-owned buildings.

(5) Cost of central office operating labor.

From a detailed consideration of these five factors, it is possible to prepare estimates showing the first cost and annual charges of each of the various schemes under consideration.

46. *Number of ducts for subways.*—Having ascertained the most desirable scheme of present and future distribution, and having also determined the ultimate underground conduit feeder routes, the next step in the telephone engineering problem involves the determination of the number of ducts required for each subway. It should be remembered that ultimate, rather than present, requirements should be considered.

It is a comparatively simple matter to enlarge aerial feeder facilities by adding additional cables. The enlargement of an underground conduit system, however, is a costly proposition. Usually it is much cheaper in the long run to provide the number of ducts which will be required ultimately, at the time of the original installation, than to re-excavate and lay additional ducts from time to time. Especially is this true where the conduit under consideration is placed under paving.

It is interesting to note that in many cities street paving is done entirely on a contract basis. The contractor who lays the paving is usually required to furnish a three to five-year guarantee. In such cases, it is exceedingly difficult to obtain permission to reopen the paving before the expiration of the guarantee.

The writer has known of several cases where telephone companies have been put to great inconvenience, due to the fact that their engineers lacked the foresight to provide a sufficient number of ducts at the time of the original installation, and the company was unable to secure permission to enlarge the subway for some years subsequent to its construction, due to the restrictions previously discussed.

There is nothing in the world more useless than a telephone conduit system which is inadequate and which has to be supplemented by an aerial feeder system

Ducts.	Working Pairs.	At Net Efficiency of
1	200	50.0%
2	504	63.0
3	864	72.0
4	1,238	77.4
5	1,620	81.0
6	1,980	82.5
7	2,344	83.7
8	2,704	84.5
9	3,060	85.0
10	3,420	85.5
11	3,780	85.9
12	4,128	86.0
13	4,477	86.1
14	4,827	86.2
15	5,184	86.4
16	5,536	86.5
17	5,896	86.7
18	6,250	86.8
19	6,604	86.9
20	6,960	87.0
21	7,308	87.0
22	7,656	87.0
23	8,004	87.0
24	8,362	87.1
25	8,710	87.1

Table 1.—Duct Requirements for Subscribers' Lines in 400-Pair, No. 22 Gauge Cables.

paralleling the conduit route. The prime object, of course, of underground feeder systems is to obviate aerial feeder facilities.

47. *Ultimate number of subscribers' lines for a particular route.*—The first step in laying out an underground conduit system involves the determination of the ultimate number of subscribers' lines to be cared for from the route in question. This will be accomplished by consulting the house-count study as transcribed to the fundamental plan, totaling the ultimate number of subscribers' lines found in the area which is to be ultimately cared for by the subway in question.

In so doing, it must be remembered that there is a limit to the size of underground feeder cables. While 900 and even 1,200-pair cables have been manufactured, they are not, as a rule, economical for use except in the larger cities. The prevalent sizes adaptable for use in smaller communities are 200, 300, 400 and 600-pair cables.

If we assume that the 600-pair cable represents a maximum size for use in the average Independent telephone community, each duct in the subway can only accommodate 600 pairs of wires or, in other words, 600 subscriber lines.

48. *Extra cable pairs necessary.*—

Ducts.	Working Pairs.	At Net Efficiency of
4	1,858	77.4%
5	2,430	81.0
6	2,970	82.5
7	3,515	83.7
8	4,056	84.5
9	4,590	45.0
10	5,130	85.5
11	3,669	85.9
12	6,192	86.0
13	6,716	86.1
14	7,241	86.2
15	7,776	86.4
16	8,304	86.5
17	8,843	86.7
18	9,374	86.8
19	9,907	86.9
20	10,440	87.0
21	10,962	87.0
22	11,484	87.0
23	12,006	87.0
24	12,542	87.1
25	13,065	87.1

Table 2.—Duct Requirements for Subscribers' Lines in 600-Pr., No. 22-Gauge Cables.

There is another factor to be taken into consideration: Cables can never be utilized to their full capacity. A certain leeway must be provided for the extra pairs necessary to replace defective pairs. A certain percentage of the total number of pairs in any given cable is bound to become useless, sooner or later, despite all precautions to the contrary.

No matter how carefully a cable may

Ducts.	Working Pairs.	At Net Efficiency of
1	150	50.0%
2	378	63.0
3	648	72.0
4	929	77.4
5	1,215	81.0
6	1,485	82.5
7	1,758	83.7
8	2,028	84.5
9	2,295	85.0
10	2,565	85.5
11	2,835	85.9
12	3,096	86.0
13	3,358	86.1
14	3,620	86.2
15	3,888	86.4
16	4,152	86.5
17	4,422	86.7
18	4,687	86.8
19	4,953	86.9
20	5,220	87.0
21	5,481	87.0
22	5,742	87.0
23	6,003	87.0
24	6,271	87.1
25	6,533	87.1

Table 3.—Duct Requirements for Subscribers' Lines in 300-Pair, No. 19 Gauge Cables.

be manufactured, nor how rigid the specifications under which it is constructed, failures are prone to occur. Again, a prevalent source of cable pair trouble is to be found in the mechanical cable joints—the splices. Most companies observe every precaution to prevent failure at the cable splices, but it is well nigh impossible to entirely obviate this trouble due to the nature of the work involved.

49. *Additional points to be considered in underground distribution.*—In planning underground distribution facilities, another point should be borne in mind: The house-count study is not infallible—it is

Ducts.	Working Pairs.
1	320
2	640
3	960
4	1,280
5	1,600
6	1,920
7	2,240
8	2,560
9	2,880
10	3,200
11	3,520
12	3,840
13	4,160
14	4,480
15	4,800

Table 4.—Duct Requirements for Local Trunk Circuits in 400-Pair, 22 Gauge Cables. At 80 Per Cent Constant Efficiency.

at best an estimate. No telephone engineer, no matter how proficient he may be, can prognosticate future telephone development with such a degree of proficiency as to render his plans absolutely accurate. The trend of telephone growth may change—it frequently does, and often at very short notice.

Still another point—underground cable

Ducts.	Working Pairs.
1	240
2	480
3	720
4	960
5	1,200
6	1,440
7	1,680
8	1,920
9	2,160
10	2,400
11	2,640
12	2,880
13	3,120
14	3,360
15	3,600

Table 5.—Duct Requirements for Local Trunk Circuits in 300-Pair, No. 19 Gauge Cables. At 80 Per Cent Constant Efficiency.

facilities must be so planned as to render them flexible. In other words, a sufficient number of pairs must be provided to allow the operating department some leeway in assigning the distribution of pairs. This point will be considered further in a subsequent installment.

Therefore, it is most necessary to provide cable facilities over and above the ultimate number of subscribers' lines which the development study shows one may reasonably expect for the area under consideration. Due to the limitations imposed by cable sizes, the number of ducts to be provided for the service in a given territory is also affected by the factors discussed in the foregoing paragraphs.

To recapitulate, in planning a given feeder route, it is first necessary to know the ultimate number of subscribers' lines as shown by the development study and then make an allowance for such contingencies as cable failures, changes in the rate of subscribers' growth, etc.

50. *Units in cable sizes.*—As already suggested, several sizes of cable have been adopted as units in underground cable construction—the 200, 300, 400 and 600-pair, and even in some cases, the 900 and 1,200-pair cable. In the ordinary medium-sized community the 600-pair cable may be adopted as a unit, and in the smaller plants the 300 or 400-pair cable.

Tables Nos. 1 to 6 inclusive, illustrate the duct requirements for subscribers' lines in various sizes of No. 22 gauge and No. 19 gauge cable. In each of these tables it will be noted "the net efficiency" is given. By "net efficiency" is meant the maximum safe ratio of working pairs to the total number of pairs in a cable.

Ducts.	Working Pairs.
1	64
2	128
3	192
4	256
5	320
6	384
7	448
8	512
9	576
10	640
11	704
12	768

Table 6.—Duct Requirements for Toll Lines and Toll Switching Trunks in 80-Pair, No. 13 Gauge Cables. At 80 Per Cent Constant Efficiency.

Referring to table No. 1, if 200 pairs are required and a 400-pair cable is to be used, a net efficiency of 50 per cent will obtain. In this case one duct may be provided. If 400-pair cable is to be used and 504 pairs are required, two ducts should be provided—this on the basis of a 63 per cent net efficiency. With this explanation, knowing the net efficiency and the total number of pairs to be cared for, the method of computing the number of ducts will be obvious from a study of tables Nos. 1 to 6.

It should be remembered that these tables are illustrative of the practice of one company only. They should not be accepted as final but merely as suggestive of a means of solving your own peculiar problem. Each case should be analyzed on its individual merits and every effort made to find a solution that will prove most economical and most satisfactory for the case under consideration. In rare instances, underground cables may be safely utilized to a higher degree of efficiency than the figures given in these tables.

Quarterly Meeting of Western Pennsylvania Independents.

The Western Pennsylvania Independent Telephone Association, at its quarterly meeting held in Pittsburgh, April 11 and 12, protested to the Pennsylvania Public Service Commission and Postmaster General Burleson on the attitude of the American Railway Express Co. toward Independent telephone companies in the western section of the state.

The express companies have ordered out Independent telephone service in a great number of places in face of the fact that in several instances the Independents have a much greater development than the Bell company, thus depriving the majority of telephone users in that particular locality of service which they really need.

Captain W. S. Vivian, of Chicago, secretary-treasurer of the United States Independent Telephone Association, gave an interesting talk on his experiences with the Signal Corps in France.

K. B. Schotte, of Kittanning, presented a paper on "Commercial Conditions and How Affected by Government Control."

A number of telephone manufacturers were represented with attractive exhibits of telephone equipment and supplies. Among them were the Automatic Electric Co., the Frank B. Cook Co., and the Reliable Electric Co., of Chicago, the Stromberg-Carlson Telephone Mfg. Co., of Rochester, N. Y., the Leich Electric Co., of Genoa, Ill., and the Holtzer-Cabot Electric Co., of Boston, Mass.

After transacting the regular routine business and deciding to hold the next meeting in Jamestown, N. Y., some time in the month of July, the meeting was adjourned.

Commissions, Courts and Councils

Discussions and Rulings of State Bodies Having Supervision Over Telephone Companies — Decisions of Courts in Matters of Interest to Public Utilities and Actions of City Councils Relative to Franchises, Rates and Service

Texas Legislation Affecting Telephone Companies.

The Texas legislature, which adjourned the middle of March, enacted very few laws which in any way affect telephone companies. The principal one of these is the minimum wage bill, which provides for the establishment of a commission which is to be known as the Industrial Welfare Commission. It is to be composed of three persons, as follows:

The head of the Bureau of Labor Statistics, who is chairman; the representative of employers of labor on the Industrial Accident Board, and the state superintendent of public instruction. The latter office is at present filled by a woman. The law also provides that the commission may employ help and build up an organization.

This commission is given the power and it is made its duty to ascertain wages paid, hours and conditions of labor and employment of women and miners in the various occupations, trades and industries in Texas. It is its duty to make investigations into the comfort, health, safety and welfare of women and minor employes. It may request all employers to furnish reports and information for its use concerning their employment of women and minors, and is to have free access to the place of business of such employers and may hold hearings at which employers, employes or other interested persons may appear and testify.

The commission is to determine a minimum wage to be paid women and minors engaged in any occupation, trade or industry in the state and when such minimum wage is determined, it will order it put into effect by the employers, giving the employer 60 days' notice. Under this law, however, the commission cannot make any such order effective until November 1, 1919. The bill also defines a minor for the purpose of this law, as a person of either sex, under 15 years of age.

A few bills of minor importance and principally of importance to incorporated companies, were enacted. These refer mostly to such matters as the filing fees for corporations, the franchise tax on foreign corporations and domestic corporations, etc.

Company at Davenport, Neb., Given Rate Increase.

The Nebraska State Railway Commission informs the Davenport & Kiowa Telephone Co., a recent applicant for an increase in rates, based in part on the showing that it desired the money to pay for a new central office to replace one destroyed by fire, that it cannot sanction the theory that debts may be paid out of earnings, i. e., the contributions of the public.

It suggests that the company has one of two methods to pursue, when it makes an addition to its property, it may apply for the sale of sufficient stock to pay therefor, or it may forego dividends to pay the debt and get the money back later in deferred dividends.

The company has been charging a flat rate of $1 a month, with 25 cents for switching. It desired rates of $2 for business, $1.50 for residence and $1.25 for farm lines, with a rebate of 25 cents a month for prompt payments. The rates allowed by the commission are:

	Gross.	Net.
Business	$1.90	$1.75
Residence	1.40	1.25
Farm	1.40	1.25

Switching charge, $3 a year.

The commission finds that the history of the company, which started as a mutual, is too vague and uncertain; that it cannot go behind 1911. At that time the company had stock amounting to $6,400. It has paid but four dividends in the years between. The commission computes the amount of dividends sacrificed at $2,407, allowing it a capitalization of $7,800, upon which it is to be allowed to earn 8 per cent dividends. It will allow a stock dividend of $2,400, or an annual dividend of $624.

The company is instructed as fast as possible to install standard telephones of its own and retire from service those still in use which were purchased by subscribers when it was a mutual. The company is also ordered to readjust its farm lines and reduce materially the number of subscribers on its most extensive lines. It is also ordered to see

that full time of linemen is charged on subscriber's stations and lines owned by the latter.

To Establish Zone System of Collection in Omaha.

The Nebraska Telephone Co., has been given permission by the state railway commission to organize a zone system of collection in the city of Omaha. Under the tariffs of the company heretofore a discount of 50 cents a month is allowed on all bills paid by the tenth of the month. The result is that 36 per cent of the subscribers wait until that day to pay, and the office is swamped. The collections cover 24,000 subscribers, and a considerable number mail their checks at about the same date. The result has been an overworked force three days in the month and an underworked one the remainder.

The commission order permits the company to group its six exchanges into three exchange units, averaging about 9,000 telephones each. On one group discount day will remain at the 10th, on another the 14th and another the 18th.

Vindictive Farmers Suffer Loss in Competitive Plant.

At a recent hearing before the Nebraska State Railway Commission on the application of the Odell Telephone Co. for permission to issue $5,000 of additional stock, it developed that an exchange of 100 telephones, after two years' operation as a competitive exchange in Odell, had caused a loss of over $4,000. The farmers of that vicinity got into a quarrel with the Odell company over service, and swore a mighty oath to get even by building an exchange of their own.

The commission sought to dissuade them and by making onerous requirements before permitting a stock issue tried to discourage them. By that time the quarrel had reached the personal stage, and 50 of the farmers sat down and wrote out their checks for an aggregate of $10,000. The exchange was built in the high price period and cost about $90 a station. A fourth of the old company's subscribers only went with the new company, and when the farmers, in orders to stop further losses, bought out the other company a few weeks ago, they had only 65 of the old company's subscribers.

The new company paid $20,000 for the old company's property, paying cash therefor, a number of the farmers borrowing the money on their own notes. The Odell company had only $8,200 stock out. This was retired and the directors decided to ask for $5,000 more. As the purchasers had neglected the little formality of getting an inventory, the commission declined to authorize the issue until one was furnished. The farmers had already charged off $4,000 loss on their own plant, and now stand to lose $5,000 more because of the duplicated property that must be eliminated.

Pay Stations Silent Owing to Cut In Commissions.

Between four and five thousand public telephones are reported to have automatically passed out of business on April 1 when Philadelphia's retail druggists made good their threat to have their service disconnected because the Bell Telephone Co., of Pennsylvania, refused to reconsider its determination to revise commission rates to pay station agents.

According to David J. Reese, chairman of the Philadelphia association's telephone committee, the druggists are standing solidly behind their guns and are prepared to fight the controversy to the limit.

Admitting that a considerable number of the druggists still had pay stations in use, he declared that this was caused by alleged dilatory tactics on the part of the telephone company in failing to sever the connection on the date set in the association's ultimatum.

The number of muted telephones in drug stores he placed at about 5,000. According to telephone officials, there are less than 4,000 druggists' pay stations in the city and numbers of these, it is said, have secretly advised the company that they wish the service retained.

Although determined to back their stand to the limit, there will be no interference with the company's property by overzealous druggists, Mr. Reese said. The telephone committee, he declared, would not tolerate such tactics.

P. C. Staples, division manager of the company, has announced that he intends to install pay stations in all reputable establishments, from whom applications are said to be pouring into the telephone company's headquarters daily.

Jamestown, N. Y., Merger Passed Over Mayor's Veto.

The common council of Jamestown, N. Y., has passed a resolution permitting the merger of the Bell and Home telephone companies of Jamestown, over the veto of Mayor Carlson. The mayor objects to the merger on the ground that the common council had jurisdiction over the rates of the Home company and this is surrendered by the merger. He also advocated the submission to the people of

"Telephony's" 1919 Directory Ready for Press.

The 1919 edition of TELEPHONY's Directory of the Telephone Industry, to be put to press in ten days, will contain a new special feature that will make the volume indispensable to every telephone man in the United States. This is a section devoted to data relating to government control of the telephones and telegraphs. In it will be presented in chronological order all the official orders and bulletins issued by the Postmaster General, by the wire control committee, the operating board, and other subsidiary organizations which have been in charge of the wire industry since August 1, 1918.

It will also contain a complete list of members of these boards and governing committees and of the Independent supervisors who are directing telephone affairs in the various districts.

This will be the first complete printed collection (in permanent form) of all the data relating to federal control and management, and should be in the hands of every telephone manager and executive. Every company should see that all heads of departments have a copy of this directory which will also contain the valuable information furnished in past years, including post office addresses of Independent telephone companies, type of equipment, name of buyer, etc.; officials of the national and state associations, personnel of state commissions, a buyer's index, and other important details about the telephone business.

Many of the progressive Independent companies have already sent in orders for extra copies for distribution among their connecting companies and executives. Do you not think it would pay you to thus favor your connecting companies and employes?

Although the prices of printing, paper, engraving—and, in fact everything that enters into the publication of a book—have increased from 30 to 50 per cent in the last year, the old price for the Directory of $3 per copy, postpaid, still holds for operating companies.

Send in your order instructing us to mail a 1919 Directory to each of your managers, so they will have this useful information at hand. The number of extra copies available is limited.

the city of a proposition that the municipality purchase and operate the Home company.

The Home company secures control of the Bell interests by this merger, the combined interests to be known as the Jamestown Telephone Corporation, of which John H. Wright, principal owner and manager of the Home company, will be in charge.

Secure Writ of Review of Washington Rate Rulings.

Tacoma joined Seattle recently in procuring writs of review against the Washington Public Service Commission's decision sustaining increased telephone rates of the Pacific Telephone & Telegraph Co., which became effective in that state March 1. Both petitions were made returnable in the Thurston county superior court on April 10.

Spokane is not represented on appeal because the commission is reserving its decision as to rates there, and it is expected that a settlement will be reached in that case.

Home Telephone Co., Fremont, Ohio, Asks for Franchise.

The Home Telephone Co., of Fremont, Ohio, has presented an application to the city council asking for a 25-year franchise. The company desires that the franchise approve present locations of poles, wires, etc., but that all future outside construction work be done under direction of service and safety director.

Under terms of the franchise, the company will grant the right to the city to use poles for stringing wires for construction of fire and police alarm system, should the city install systems of this character.

Bill to Increase Tax on Telephone Earnings Passes.

The house of the Minnesota legislature has passed Representative E. F. Serline's bill increasing the gross earnings tax on telephone companies. He offered amendments which were adopted, changing the classification of companies. Class A companies were raised from $20,000 to $50,000 minimum payments, class B from $20,000 to $50,000 maximum earnings. Class C co-operative telephone companies, not operated for profit, will be taxed 10 cents per telephone, instead of 15 cents as under the original bill.

Judgment Against Portland Home Sold at Sheriff's Sale.

A judgment of $1,102,050.23 was sold for $34.54 at sheriff's sale at Vancouver, Wash., on March 18. It was to satisfy a judgment against the Northwestern Long Distance Telephone Co. and the Home Telephone & Telegraph Co., of Portland, Ore., in favor of the Title Insurance & Trust Co., and covered all resources of the companies including franchises and other properties.

A judgment was rendered against the property of the company lying in Clark county, and was bought by F. H. Crosby.

Instruments Restored to Patrons Using German.

The Farmers' Mutual Telephone Co., of Pocahontas, Mo., must restore to service all telephones that were discontinued last fall because of the rule in regard to the speaking of any language other than English over the telephones, according to a ruling by the Missouri Public Service Commission.

Summary of Commission Rulings and Schedule of Hearings.

ILLINOIS.

April 2: The commission suspended until August 3 the proposed rates for telephone service in Cowden by the Cowden Mutual Telephone Co., pending a hearing concerning the propriety of the proposed rates. No. 9000.

April 2: The commission suspended until August 13 the proposed rates for telephone service in McNabb and vicinity by the McNabb Mutual Telephone Co., pending a hearing concerning the propriety of the proposed rates. No. 9004.

April 2: The commission suspended until August 17 the proposed rates for telephone service in Auburn and vicinity by the Auburn Telephone Co. and in Girard and vicinity by the Girard Telephone Co., pending hearings concerning the propriety of the proposed schedules. Nos. 9008 and 9009.

April 3: The commission approved an agreement between the Cleveland, Cincinnati, Chicago & St. Louis Railway Co. and W. G. McAdoo, director general of railroads, and the Kinlock Long Distance Telephone Co., covering the construction and maintenance of a telephone line in Wood River, Madison county. E-989.

April 4: Farmers Fountain Telephone Co. ordered by the commission on May 1, 1918, to take up and cancel certain promissory notes of the aggregate amount of $6,155 face value, issued without approval and the proceeds used for operating expenses. Supplementary petition filed by the company setting forth the fact that it has paid $1,265 of these bonds and asking extension of time within which to pay the balance of the notes. Time extended by commission to May 1, 1920. No. 7856.

April 4: The commission approved a traffic agreement entered into by the receivers of the Central Union Telephone Co. and the Mann Telephone Co., dated December 1, 1918. No. 8767.

April 4: The commission granted permission to the Henry Telephone Co., of Henry, to quote gross rates for business and residence exchange rates 25 cents in excess of the present rates, this amount to be discounted when rentals are paid on or before the 15th of the month in which service is rendered. No. 8929.

April 14: Hearing at Springfield in the matter of the application of the Central Union Telephone Co. for an order authorizing it to acquire and hold certain securities heretofore acquired and held by the receivers of the Central Union company. No. 9058.

April 14: Hearing at Springfield in the matter of the application of the Colchester Farmers Telephone Co. and the Macomb Telephone Co. for the approval of an intercorporate contract dated December 24, 1918, covering connections between the exchanges at Colchester and Macomb. No. 8936.

April 14: Hearing at Springfield in the matter of the proposed advance in rates for telephone service in Cowden by the Cowden Mutual Telephone Co. No. 9000.

April 15: Hearing at Springfield in the matter of the proposed change in rates for telephone service in Auburn and vicinity by the Auburn Telephone Co. No. 9008.

April 15: Hearing at Springfield in the matter of the proposed change in rates for telephone service in Girard by the Girard Telephone Co. No. 9009.

April 15: Hearing at Springfield in the matter of the joint application of the Central Illinois Telephone & Telegraph Co. and the Lincoln Telephone Co. for the approval of the sale by the Central Illinois comany and purchase by the Lincoln company of the telephone property in the city of Lincoln and vicinity; also for certificate of convenience and necessity to the Lincoln Telephone Co. to operate and for an order authorizing it to issue $145,000 of its capital stock. No. 9019.

April 15: Hearing at Springfield in the matter of the joint application of the New Holland Telephone Co. and the Lincoln Telephone Co. for the approval of the sale by the New Holland company and the purchase by the Lincoln company of the property of the former in New Holland and vicinity; also for a certificate of convenience and necessity to the Lincoln company to operate in that vicinity and for an order authorizing it to issue $16,500 of its capital stock. No. 9020.

April 15: Hearing at Springfield in the matter of the application of the Elkhart Independent Telephone Co. and the Lincoln Telephone Co. for the approval of the sale by the Elkhart company and purchase by the Lincoln company of all of the property of the former company in Elkhart and vicinity; also for a certificate of convenience and necessity to the Lincoln company to operate in the village of Elkhart and for an order authorizing it to issue $11,000 of its capital stock. No. 9021.

INDIANA.

April: Order allowing the Antwerp Telephone Co., Antwerp, Ohio, to increase its rates at the Woodburn, Ind., exchange from $1.50 business rate to $2.15 with 15-cent rebate if paid on or before the 10th day of the month; residence Independent line from $1 to $1.40 with 15-cent rebate, rural party line from $1 to $1.40 with 15-cent rebate. An appraisal was made of the property which shows the value of the property in Woodburn to be: Cost of reproduction, $27,479; present value, $22,518, including intangibles and going value.

April: The commission granted the application of the Citizens Telephone Co., of Cambridge City, for authority to increase its capitalization from $10,000 to $125,000 common stock. Detailed appraisal of the property showed the cost of reproduction to be $177,165; present value $141,471, including intangibles and going value.

April: Order issued allowing the Fulton Telephone Co., of Fulton, Ind., to increase its business rate from $1.25 to $1.75 with 15-cent rebate if paid on or before the 10th day of the month; resi-

No Dry Cell Renewals When You Install The C. A. X.

(Community Automatic Exchange)

AUTOMATIC EL

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Please tell the Advertiser you saw his Advertisement in TELEPHONY.

THE Community Automatic Exchange (C. A. X.) can use either local battery or common battery telephones.

The operating companies which have installed this equipment to serve their outlying exchanges, have found that except on unusually long lines, the common battery telephones give better and more uniform transmission than local battery instruments.

They find that the money they formerly spent for dry cell renewals meets practically the entire cost of operation and maintenance of the C. A. X. equipment.

This means that the operators' wages no longer paid because the C. A. X. needs no operator, is clear gain for the company and enables it to make a fair profit at reasonable rates.

The subscribers who are now receiving C. A. X. service value it highly because of the better transmission, because it is in operation 24 hours a day every day in the year, because it is always uniformly prompt and reliable, and because they can make all their connections themselves, by means of the dial, instead of waiting for the operator to answer their calls.

Your subscribers will also value C. A. X. service and your company will benefit by its economies.

CTRIC COMPANY

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dence from $1 to $1.40 with 15-cent rebate; rural party line from $1 to $1.30 with 10-cent rebate. Appraisal of the property by J. K. Johnston, Indianapolis, showed the cost of reproduction to be $19,480, and the present value, $16,734, including intangibles and going value.

April: The commission issued an order authorizing the Knightstown Telephone Co. to increase rates as follows: Independent line business from $2 to $2.50 per month; independent line residence from $1.25 to $1.50. Valuation of the property showed the cost of reproduction to be $61,341, present value $50,213, including intangibles and going value.

April: The commission granted the application of the Flora Telephone Co., Flora, Ind., for authority to increase rates as follows: Independent line business from $1 to $1.35 per month; independent line residence from $1 to $1.25 per month; rural party line from $1 to $1.30 per month. A valuation of the property showed the cost of reproduction to be $48,932 and the present value $41,117, including intangibles and going value.

April: Order issued authorizing the Summitville Telephone Co., Summitville, Ind., to increase business rate from $1.25 to $1.90 with 15-cent rebate; independent line residence from $1.25 to $1.65 with 15-cent rebate; rural party line from $1 to $1.40 with 15-cent rebate; switching service where the farmers own their own lines from $2 to $6 per year. A valuation of the property showed the cost of reproduction to be $17,902 and the present value $14,912, including intangibles and going value.

April: Petition for increase in rates filed by the Hoosier Telephone Co., which operates exchanges in Salem, Orleans, Paoli, Campbellsburg and Martinsburg. Appraisal of the property was made by J. K. Johnston, Indianapolis, also appraisal made of the Southern Telephone Co., at Salem, for the purpose of sale to the Hoosier company.

April: Petition filed by the Veedersburg Telephone Co., Veedersburg, Ind., for authority to increase rates. Appraisal of property shows the cost of reproduction to be $36,080 and the present value $30,502, including intangibles and going value.

April 7: Hearing on the application of the Monon Telephone Co. for increased rates at Monon.

April 10: Hearing on the application of the LaPaz & Lakeville Home Telephone Co. on the application for increased rates. Appraisal made of the property and petition filed by J. K. Johnston, of Indianapolis. Carl Mote, secretary of the commission, heard the case and accepted the valuation of the engineer for the purpose of rate making. The operating expenses of the company was only obtained for the first three months of 1919 as prior to that time the company did not keep any books or records that would show the operating expense. Mr. Mote criticized such methods very severely but stated his opinion that the company was entitled to immediate relief. For that reason he would make a rate although against his desire in the matter which was to refuse any increase asked on account of the methods of keeping accounts.

Kansas.

March 15: Application of the German Valley Telephone Co. for permission to increase its telephone rates at Hudson, granted. No. 2596.

March 15: Application of the Gove County Telephone Co. for permission to sell part of its telephone plant and property at Quinter, granted. No. 2840.

March 15: Application of the Blue Rapids Telephone Co. for permission to increase rates at Blue Rapids. No. 2822.

March 20: Application of C. R. Huggins, doing business under the name of Wheaton Telephone System, for permission to increase rates at Wheaton, granted. No. 2711.

March 22: Application of the Home Telephone Co. for permission to file an amended schedule of rates for telephone service at Conway Springs and Argonia, granted. No. 2782.

March 22: Application of the Potter Telephone Co. for permission to make certain changes in the rates for the telephone service at Potter, granted. No. 2750.

March 22: The commission dismissed without prejudice the case of the Farmers' Educational Cooperative Union of America, a corporation, by H. A. Washburn, chairman investigating committeee, complainant, vs. the Junction City Telephone Co. No. 2638.

March 22: The commission granted the application of H. R. Geesling & Son, doing business as the Turon Telephone Co., for permission to increase rates for service at Turon. No. 2751.

March 22: Application of J. E. Christie, doing business under the name of the Thayer Telephone Co., for permission to make certain changes in rates for telephone service at Thayer, granted. No. 2764.

March 22: Application of the Kansas Telephone Co. for permission to file and put in force a new schedule of local exchange rates in the city of Lawrence, Kansas, granted. No. 2702.

March 29: Application of the Norton County Co-operative Telephone Co. for permission to issue its capital stock in the amount of $16,000, granted. No. 2849.

March 29: Application of the Norton County Co-operative Telephone Co. for a certificate of convenience and authority to transact the business of a public utility in the state of Kansas, granted. No. 2848.

March 29: The commission granted the application of the Farmers & Merchants Mutual Telephone Co. for permission to sell its telephone plants and property at Norton and vicinity. No. 2847.

March 31: Application of the Harris Telephone Co. for permission to make certain changes in the rates for telephone service at Harris, granted. No. 2876.

April 2: Application of the Katy Telephone Co. for permission to increase telephone rates at Elsmore, granted. No. 2786.

April 4: Application of the Farmers' Telephone Co. for permission to make certain changes in its rates for telephone service at Sylvia, granted. No. 2805.

April 7: The commission granted the application of the Ellis Telephone Co. for authority to issue its note in the amount of $4,000. No. 2883.

April 7: Application of the Arma Central Telephone Co. for permission to sell its telephone plant and property at Arma, granted. No. 2875.

Minnesota.

April 22: Hearing in the village of Marine-on-St. Croix on the application of the Scandia-Marine Mutual Telephone Co. for an indeterminate permit to operate a local telephone exchange in that village.

April 25: Hearing at Blooming Prairie on the application of the Steele County Telephone Co. for authority to increase its local and rural rates at Blooming Prairie.

Nebraska.

April 7: In the matter of the application of the Davenport & Kiowa Telephone Co., of Davenport, order issued permitting the following schedule of charges: Business, gross, $1.90, net, $1.75; residence and farm service, gross, $1.40, net, $1.25; switching service, $3 per year.

April 7: Application of the Bassett-Springview Telephone Co., of Bassett, for permission to issue stock to value of $600, filed.

April 7: Complaint of A. Cerny against Madison Telephone Co., alleging that no free service is given Lindsay with Madison and Newman Grove exchanges, filed.

April 8: Application of the Ansley (Neb.) Telephone Co. for information on how to finance extensions being made eight miles into the country, filed.

April 8: Complaint of Albert Hospel, of North Platte, against Nebraska Telephone Co., alleging poor service, filed.

April 8: Complaint of William Baker, of Lincoln, against Lincoln Telephone & Telegraph Co., alleging overcharge on exchange rental, filed.

April 8: Complaint of C. L. Strong, of Syracuse, against Lincoln Telephone & Telegraph Co., alleging poor condition of farm lines, filed.

April 8: Application of the Stella (Neb.) Telephone Co. for permission to establish a rate for extension sets, filed.

April 8: Application of the Nebraska Telephone Co. for the establishment of a zone system of collections for Omaha exchange; it appearing to the commission that the proposed system will give a proper distribution of the peak collection load, company authorized to establish new discount limit days for 10th, 14th and 18th of each month.

April 8: Application filed by Guide Rock (Neb.) Telephone Co. for permission to establish new schedule of rates, as follows: Business, $1.75; residence, $1.25.

April 10: Application of the Platte Valley Telephone Co., of Scottsbluff, for permission to increase toll rates 25 per cent, originally made December 5 but later suspended by the commission; it appearing that the company has a large number of connections with the Nebraska and the Lincoln telephone companies, which companies have been charging 25 per cent over and above the regularly established rates, by permission of the commission, and that this produces a discriminatory condition, ordered that applicant be given permission to increase toll rates 25 per cent to May 1, 1919, or to whatever future date may hereafter be fixed.

April 10: In the matter of the complaint of sundry business men against the Pawnee Telephone Co., of Pawnee City, ordered that a supplementary order issue that the company shall proceed to install a modern common battery switchboard and the necessary appurtenances. The company had an Ericsson board of Swedish make, and the commission finds that the attempted rehabilitation thereof has not been satisfactory, due to the lack of proper repairs not being available for purchase. The rate hearing was postponed to a date to be fixed later.

April 11: Application of the Odell (Neb.) Telephone Co. for permission to issue $5,000 additional stock; hearing held and postponed until an inventory of the property can be presented to the commission upon which a stock issue can only be based.

What Is Your Company Doing?

Chats About Company Doings.

By Stanley R. Edwards.

Telephone exchanges in the large cities have busy times when the local regiments return from abroad. Especially was this so in New York City when the 27th division (New York's own) arrived from overseas.

The telephone company anticipated a rush of calls with a small advertisement which read:

"Wait for the boys of the 27th to telephone you!

The first thought of the boys of the Twenty-seventh Division will be to rush to the camp telephones to get in touch with those they left behind, *but they will be unable to do this if the telephone lines designed primarily for the normal needs of the camps are congested by thousands of incoming calls.*

And, in addition, you will probably be unable to reach them because of the difficulty in locating an individual due to the immense areas of the camps, and the distances, in most cases, between telephone stations and quarters."

In news items it was explained that the camps are provided with ample telephone facilities for the use of the men in telephoning their relatives and friends, but the boys will be unable to reach those outside the camps if the telephone lines are congested by thousands of incoming calls. Even if all these incoming calls could be handled without holding up the outgoing calls from the boys, it would be almost impossible to locate individuals and get them to the telephone promptly because of the immense areas of the camps and the distances, in most cases, between telephone stations and quarters.

The accompanying photograph, which was sent us by Sgt. Maj. R. M. Moffitt, of Atlanta, Ga., shows the workings of a Boche radio telephone set from the Argonne. Its uses are for radio receiving, ordinary field-buzzer and telephone communication.

No rubber is used in its construction except for the two plugs, which are of a very poor grade, probably made from stock reclaimed by the synthetic process developed in Germany after the rubber shortage became serious.

Wood and bone were used as insulators principally. The steel case was protected by a layer of passepartout. The mouthpiece, at the back of the set, is hinged to fold into compact carrying position or to open for talking use.

"Just as the strength of a brick structure depends upon the strength and quality of the individual bricks that constitute the wall, so the strength of an organization depends upon the abilities and qualities of the individuals making up that organization. Only when these people are of the right caliber, can they be cemented into that larger relationship which brings about co-operation and ultimately well-rounded service. . . .

Proper leadership in each department must be emphasized. We cannot hope to have a faulty head and a strong force under that head. . . .

It has been my experience, too, that what training has been given is often misdirected. Again I will repeat that proper

A Boche Radio Telephone Set.

leadership in each department must be emphasized. It is 'the operator in charge,' as she may be known, or the chief operator with her supervisor, who should have special training. She knows as much as your best operator but how much more?

Has she ever been offered a special course that might develop her so that from her resourcefulness she would be able to direct her department with more confidence and wisdom? Has she had any definite help to guide her in judging men and women whom she may be selecting as her co-workers? Has she been trained to arouse interest, secure attention and make friends? Are you making her capable of demanding the maximum service by understanding human nature?"

These paragraphs are extracts from an address at the convention of the Wisconsin State Telephone Association in February. Miss Margaret Burgi, chief operator of the United Telephone Co., of Monroe, was the speaker. Her address was published in full in TELEPHONY of February 22. A man long engaged in traffic work read it. It made such an impression upon him that he wrote a friend in another state, one who is doing excellent work in improving traffic conditions in his state.

"Did you read that address made by Miss Burgi at the Wisconsin convention, published in TELEPHONY of February 22?" was the query.

"I did read it—not once but three times," was the reply by return mail. "And I intend to read it several more times."

So much as regards telephone people. Let's see what people in other lines of business are thinking.

"Most of our troubles originate with our supervisors, or our superintendents," declared the superintendent of offices of a large Chicago concern employing some 8,000 persons. "Our supervisors, our executives, represent, today, our biggest problem, and this year we are trying out something new which has never before been done, so far as I know."

That is the decision of a firm which for four years has been studying the problem of employes. To those backing the plan, America is a country famed for its personality, its individuality.

We have originated many things, we have our trade-marks, our slogans and inventions of all kinds, but one thing has been overlooked. It is the treatment of employes—human engineering, so to speak. The war revealed this in all of its nakedness.

"Ships, ships, more ships, and still more ships," was a declaration made by a great English statesman which became famous overnight. It aroused this country to activity—and a nearly extinct industry, ship-building, was revived. And the cry was changed into, "Men, more men and still more men," but the methods pursued to obtain them were crude, indeed, at the commencement of the work.

Most any one was employed. It is even said that foremen went out on the street engaging men as they came from work in cigar factories and other establishments at very high wages regardless of their fitness for the work to be performed, and the so-called employment office had nothing whatever to do with the hiring. Of course, there was a tremendous waste which later was reduced to a large extent when thought was concentrated upon the problem of "hiring and firing." Instead of many doors in and out—speaking figuratively as regards "hiring and firing"—only one door, the employment department was authorized.

The power of "hiring and firing," and particularly the latter, is one which executives dislike to give up but the modern establishment is adopting the policy that

only the employment department "hires and fires." And the longer this policy is tried out, the more convinced are its supporters that it is really a principle of management.

But to get back to the plan of this Chicago concern of educating its executives or supervisors, those in charge of the smaller groups of employes. A school of 10 weeks' duration has been established to teach them their business and what each one's job is. They are shown that it is the company's purpose to make money, honestly and conscientiously, and that they can help themselves by helping the company and its business.

In other words, the principle of "mutual interest" is to be inculcated into the minds of the supervisors who, in turn, will naturally develop the thought in the minds of those under them.

The establishment of output records is the best innovation that the company has made. These records form the basis for determining the payment of the employes. The payment is not based upon what the foreman or supervisor thinks of an employe's work, but upon what they can earn. Appearances are deceptive—often the foreman's opinion of an employe is favorable, while the work actually performed is not.

Errors are made. When a number are made they are traced to the worker, even going so far as to discharge—the supervisor.

This concern is working toward a high wage scale and a high standard of service with low cost. The employes want high wages and fair treatment. And the company is constantly increasing its wage. It endeavors to give its employes a fair deal and a chance to grow. Sometimes employes prefer a job with a better-sounding title, rather than a promotion. That's human nature.

"Study the problem," says this superintendent of offices, "Look it squarely in the face and do the right thing. Let reason prevail. The right way may not be your way but reason should prevail."

A familiar axiom in business is "The customer is always right." And many firms have demonstrated that it is a good business-building policy.

A paraphrase of this is: "The employe is always right." Whether an injury to an employe is imaginary or not, it's true, in his mind, if it is not reasoned out with him. And if he leaves a company's employ, it is still more true that "the employe is always right," for he can do infinite harm by spreading his story, be it imaginary or true.

One of the women employes of a concern approached the foreman, said she was sick and wished to go home.

"Oh, go back to work; you're not sick," was the response to her request. He thought she was not sick but that she wanted to go out shopping, and he was not going to let her "slip anything over on him."

In this particular case it happened that she really was sick. How much better would it not have been for that foreman to have said: "If you are sick, go and see our doctor before going home. If you are very sick, he will see that a taxi is provided to take you home and prescribe for you."

This particular organization to which the foreman belonged had an adequate hospital with a doctor in attendance.

But even supposing she had not been sick. It would have been better to let her slip something over than to assume the attitude he did. The absence of one employe out of the 8,000 in that organization would not have been a serious detriment to the business.

One method produces discontent and ill will; the other produces good will and loyalty to the company.

An executive is rated by his ability to understand human nature and to handle people. He may be a good man and understand the technical end and details of the business—but his rating depends upon the two qualities just mentioned.

The morale of an organization is most essential to its success. A company with a low morale, like an army, will not produce results. It will not "bring home the bacon."

An executive is responsible for an organization's morale. Here are a few types of executives that are productive of low morale:

The wishy-washy fellow who is a fine chap generally—everything goes with him.

The cold-blooded, inconsiderate chap.

Procrastination in an executive tends to lower morale. The "putter-off" never gets anywhere and his department never makes money, not to say, friends. He is of the circumlocutory type—the man who hurries to get across the bridge for fear he will not make it, and then waits for the boat to go by to see the bridge readjusted.

The selfish, egotistical fellow.

The fiery-tempered chap who blows off steam every few minutes. He upsets things and produces no results.

The complacent, self-satisfied man.

The man who has eyes but cannot see.

The suspicious man who is always thinking people are working against him.

The "rhinoceros" fellow who says "let him sink or swim, that's what I had to do." He's the dangerous executive, for an executive must help his people. The rhinoceros type is the one who turns employes into anarchists and bolshevists.

Contrast these types with the kind, considerate, fair, deliberate and firm man, having faith in people. He studies them and thus comes to understand them.

He is the man who is willing to promote an employe when it is deserved, and he will make a sacrifice for the good of the individual employe even at inconvenience to himself. There are many executives who will not permit an employe to be promoted because it means breaking in another to do his work, and often it is difficult to find some one to do the work satisfactorily.

He is a sincere, broad-minded man with vision—and a smile of sincerity is worth a great deal as an executive.

He is the man who establishes confidence and faith in himself and gives more than he himself receives.

Not everyone can be an executive. When the disturbances commenced in Russia, the bolshevists took possession of everything and executives, superintendents and foremen, and, in fact, all in directive positions were turned out. Confusion, of course, resulted.

Recent newspaper dispatches indicate that reason is beginning to have a place. Those who were in directive positions are now being called back into their former positions, for it has been found through experience that there must be executives, trained for their work.

Sleet Storm Causes Great Damage to Telephone Lines.

The telephone companies of Nebraska suffered losses during the first week of April aggregating $125,000 from a heavy sleet storm that covered half of the state.

The Lincoln Telephone & Telegraph Co. was the heaviest sufferer. Over 4,000 poles were carried down by the combination of a high wind with heavily-coated wires, and on miles of pole lines it will be necessary to pull wire for weeks because of the loosened condition of lines and poles. The company estimates its loss at $80,000.

The storm covered its entire territory. The Nebraska company suffered considerable losses, and many of the smaller companies also had their lines damaged.

Princeton (Ind.) Telephone Co. May Take Over Bell Property.

Negotiations are under way between the Princeton Telephone Co., of Princeton, Ind., and the Southern (Bell) Telephone Co., of Indiana, for the purchase by the Princeton company of the Bell properties in its territory. An appraisal of both Bell and Independent properties in Princeton and vicinity has been made by J. K. Johnston, telephone engineer, of Indianapolis, preparatory to the filing of a petition by the companies for the approval of the Indiana commission.

"Telephony's" Home Study Course for Telephone Men

A Complete Presentation of the Principles Underlying Modern Telephony in All Its Branches—Arranged Systematically So That Regular Reading and Faithful Study Will Qualify Ambitious Men for Higher Positions—Prepared Under Supervision of Stanley R. Edwards—This Section Written by Jay G. Mitchell

Quiz Questions on the Preceding Installment.

1180. What is a very essential requirement, so far as it is possible of attainment, in the operation of telephone equipment? From your own experience are you of the opinion that uniform wear is possible of attainment with manually-operated multiple jacks? How is the wear equalized, approximately, in mechanical switching devices? Illustrate the numerical arrangement of the bank contacts commonly used to produce a change in the rotation of switches presented to the traffic. What is the name given to such a wiring scheme?

1181. Is the wiring scheme outlined more nearly comparable, in its general qualities, to the multiple manual switchboard or to the transfer manual switchboard? What reasons may be advanced for subdividing the telephone plant into separate offices? Why are inter-office trunk circuits intended to carry a much heavier traffic than the average subscriber's line circuit?

1182. When mechanical switching equipment is used, what is the nature of the inter-office trunk circuits? Illustrate the division of the first selector banks between the trunks for different offices in the case of a mechanically-switched telephone exchange with 1,500 line circuits and three separate offices.

1183. Is it possible to combine the operation of manual equipment and mechanical switching equipment?

PRACTICAL TALKS JUST AMONG OURSELVES.

The growth of the Fosterville Telephone Co.'s list of subscribers had been most remarkable and the excellent service furnished was deservedly popular both in Fosterville and Smithville.

The wire chief was a painstaking and thorough young man and left no stone unturned to search out and remedy the cause of each complaint made, whether received from one of the company's subscribers or from one of the operators. He also realized that a close contact with the general public is always of the greatest benefit to the company and he felt that the matter of handling complaints offered him the opportunity of establishing a personal acquaintanceship between the company and its patrons.

One of the oldest residents of Fosterville was Dr. Smith. Being an excellent physician, his services were greatly in demand and it was generally believed that his skill was often requisitioned in baffling cases by surgeons in the great city hospitals. Dr. Smith's office was in a two-room building on the front end of his residence lot, heated with an old-fashioned base burner, and equipped with an ancient secretary-type of desk and specimen cabinet and a few chairs.

The lid of the secretary's desk was habitually left open, exposing its top littered with copies of current medical reviews, letters that had been opened, read, and thrown aside, a medicine case or two, some vials and an old-fashioned gilt stag-head inkstand. The pigeon holes were stuffed with papers, some of which were undoubtedly telephone bills, and receipts, clippings and prescription blanks. In other words, Dr. Smith was an old-fashioned physician with a large practice, a big heart, and a very high standing in the community.

When the Fosterville Telephone Co. was organized, Dr. Smith was one of the original subscribers and his telephone service as originally installed had never been interrupted. Being an old-fashioned physician, he gave his services whenever there was need and he was always ready to respond to a summons, night or day.

In order to make sure that he did not miss any telephone calls, the doctor had arranged so that his office and residence were two of the selective stations on the same party line. At the home telephone he had tuned ringers installed for both parties, one in the telephone bell and one in an extension bell. When at the office he received only such calls as operated the office ringer. When at home he received all calls, by the two connected selective bells, those for the office as well as for the home.

It is to be suspected that the management of the Fosterville Telephone Co. had reserved the entire four-party circuit for Dr. Smith's use because of his public-spirited willingness to respond to all demands upon his time regardless of certainty or uncertainty of receiving any fee.

The service furnished the doctor was perfectly satisfactory for a long time when the town was small and the service and plant of the Fosterville Telephone Co. was not thoroughly developed. With the advent of new industries resulting in a rapid growth of the city, the telephone exchange, like other enterprises, increased in importance. Additions were made to the switchboard and the number of calls handled each day became many times greater than had been anticipated.

With the growth of the plant, the duties of wire chief expanded until it was found necessary to detail a man to make the tests, supervise the work of the "line gang" and take care of the repairs on the central office equipment. The management of the company devolved more and more upon the wire chief so that when an opportunity was offered him to acquire a small block of the company's stock, to be paid for out of his salary, increased for the purpose, he eagerly embraced it. It was an indication of his confidence in the great industry with which he had identified himself and in the property which his own ability and care had done so much to create. In view of his character and ability, the directors of the company at once made him secretary and, as is the custom of directors, immediately turned over to the new officer all the responsibility possible in the management of the property.

After taking a few weeks to become familiar with the duties of his new position, the secretary found to his surprise that the current bank loan carried by the company had gradually been increased from year to year. At the time of his election as secretary it represented approximately the sum collected by the company for one month's rentals. The records also showed that the costs of labor and material had advanced until the operation of the plant represented a substantial increase per station per year over the results of previous years. On account of his new duties the secretary lost his direct contact with the plant and left the operation of the equipment and its maintenance entirely to the man he had installed at the trouble desk.

In the meantime the traffic, due to the business conditions in Fosterville and Smithville, became very heavy and it was found necessary to charge the central office storage batteries during the entire day and a portion of each evening. When

the trouble clerk reached his desk in the morning, he started the charging of the batteries so that they would "float" with the load on the charging circuit throughout the period of heavy traffic.

The battery was not new, however, so that when morning came and charging was begun, the voltage had fallen, another reason why it should be "floated" with the load.

More demands than ever were made on Dr. Smith's time. Serving his old patients first, he found time to build up a practice in factories and business institutions that had settled in town since the boom started. One of his very old patients lived in the country several miles from the city and often required the doctor on short notice. Regardless of the hour, Dr. Smith always responded to a call from this patient, as he did for all his patients.

It transpired later that Dr. Smith had reported his house telephone to the trouble clerk several times because of reported failures to reach him by telephone a short time before daylight. In each case the trouble clerk had made a test of the circuit from the desk the next day, found it to test satisfactorily, and had marked the report "O K on test."

When the doctor's old patient required his services, however, at a very early hour and failing to reach him by telephone, sent a man to town to bring him out, the doctor became convinced that his residence telephone was incurably out of order. He had had several previous reports of the same trouble, but never had the matter been so forcibly presented to him as at this time.

The new secretary of the telephone company happened to receive the next report when he met Dr. Smith on the street. With it he was given a comprehensive and accurate statement of the doctor's unfavorable opinion of all telephone companies. It was evident to the former wire chief that an opportunity had been presented to him by this occurrence, to secure the support of the influential old doctor in a project that he had been turning over in his mind. This was to ask the state utility commission for authority to increase rates to meet the increased cost of operation.

The doctor was sure of only one thing—it was that he failed to receive some of his early morning calls. He was also certain that it was necessary and advisable to receive *all* his calls, and the former wire chief had no argument to offer against that statement.

A personal examination of the line and instruments failed to disclose the cause of the trouble. The ringers were then tested and found to be operative and to produce satisfactory rings. In order to make sure, however, the former wire chief tested out another set of ringers, to make certain that they were accurately tuned, and had them installed in place of those installed with the telephone in the doctor's residence.

When the old ringers were brought in, he tested them and found that they were tuned to a frequency slightly lower than that for which they were intended. He made it a point to come down to the office at the early hour when the doctor had reported his failure to receive all his calls and tested the frequencies delivered by the ringing converter *at that time.*

To his surprise it was found that when the battery voltage was low, just before dawn, the frequency of the ringing converter was somewhat higher than normal on all frequencies. With ringers tuned to a frequency that was low and with a converter delivering ringing current that was of too high frequency, the old ringers taken from Dr. Smith's residence would sometimes fail to respond.

Dr. Smith was asked to call at the secretary's office the next day and the cause of his trouble was thoroughly explained to him. As a result, he became a firm friend of the secretary of the telephone company and of the company itself. When the proposed rate increase was published, he not only failed to enter any objection but was of great assistance to the company in meeting the local situation.

The handling of complaints is the best channel through which a telephone company can establish satisfactory relations with its patrons. Each patron is entitled to a fair and complete explanation of the cause and the remedy applied when the complaint has been taken care of. A dissatisfied subscriber will make more noise than ninety-and-nine that are satisfied.

Telephone Operators in New England on Strike.

Telephone communication throughout most of New England, except Connecticut, was practically suspended April 15, by a strike of more than 6,000 operators of the New England Telephone & Telegraph Co. and the Providence Telephone Co. In Boston, Mass., and other cities the operators quit work at 7 a. m. and the wires became dead. Only chief operators remained at work, the supervisors going out with the operators.

At the local exchanges night operators whose duties ended at 7 a. m. left their boards without waiting for relief and reported to the union headquarters. Several hundred day operators reported for picket duty outside the exchanges.

Picket tours of three hours each were established about the exchanges and at the railroad terminals.

Arrangements had been made so that the business of the army and navy was interfered with as little as possible. Direct circuits not depending for connections upon telephone company operators had been established between army headquarters and various armories, camps and other stations in Boston and eastern Massachusetts and similar arrangements had been made for the naval stations.

The strike did not affect the long-distance service controlled by the American Telephone & Telegraph Co., and it was still possible on Wednesday for business houses to connect with New York and other outside points, providing their office equipment was such that the calls did not go through the New England company's switchboards. More than 100 operators are employed in the American company's exchange in Boston, and all were on duty Wednesday.

The demands of the operators' union include pay increases and the right of collective bargaining.

Holding the New England telephone strike without justification, the Post Office Department on Wednesday instructed the manager of the company at Boston to replace the strikers, or take any other steps necessary to maintain service unimpaired.

Officials said the government had expressed unwillingness to bargain collectively with the employes, its position on that question being "entirely harmonious" with principles laid down by the War Labor Board. The employes, it was said, were asked to present a schedule of the wage increases desired, but refused to do so, and the department had nothing on which to act.

A cable message signed jointly by Governors Coolidge of Massachusetts, Bartlett of New Hampshire and Beeckman of Rhode Island, calling for executive action on the telephone strike situation, was sent to President Wilson April 15. It read:

"New England urges your immediate action to relieve from great loss by telephone strike."

Gov. Coolidge on April 14 sent a message to Postmaster General Burleson urging his intervention to end the strike. Mr. Burleson wired that "every step possible was taken" to avert the strike, that the operators had walked out "without any cause existing."

Joseph P. Tumulty, secretary to President Wilson, sent a telegram on Wednesday to Miss Julia S. O'Connor, president of the Telephone Operators' Union, proposing that the striking operators submit their wage scale to William R. Driver Jr., general manager of the New England Telephone & Telegraph Co.

Miss O'Connor, in a reply, said the operators would submit their scale to Mr. Driver provided they were given the assurance of the federal government that he had been given full power to settle wage scales, retroactive to December 31, the date upon which the wage agreement between the company and the operators expired.

Sundry Snapshots Along the Trail

Observations and Comments, Pertinent and Otherwise, On the Sunshine and Shadows of Telephone Work

By Well Clay

The airy trails of fancy
Are pleasant paths to tread
But the rock-ribbed roads of solid fact
Lead to our daily bread.

A good many telephone men who have been treading the airy trails for many years, as regards rates of service, are beginning to come to the conclusion that they had better get down onto some more solid foundation if they are to remain in the business.

Assuming that it were possible to buy flour made from 80-cent wheat and meat from a steer which sold for eight cents a pound, and make a living on a dollar-a-month telephone basis, the fact that we must now buy flour made from $2.26 wheat, and $20 beef, and 70-cent butter, would make a change imperative because prices tend to find their level, the same as water and all things must conform to economic laws.

If this, then, is true, the level at which the dollar-a-month telephone rate was all right is now very much below that level at which it is necessary for it to go to be on a par with the price of today's market necessities. One must live either on what he earns or else on what someone else has earned.

In every other line than the public utility service, prices are raised from day to day as markets change and the merchant marks his goods to protect his profit, which in turn represents his living. Are telephone corporations to be like rocks in the channel of trade which are not affected by the friction of the currents which tear by them year after year? Well, it seems hardly possible that erosion will stay its course and pass by any particular business simply because you, or I, or the public, have been laboring under a delusion regarding our being subject to the blight of depreciation along with the rest of the world.

The fountain of perpetual youth has interested many and taken up the time for years in the lives of many great men, but history does not record the fact of its ever having been discovered. Some have thought for awhile that they had it cornered but their eyes grew dim with age and their hand palsied just the same when Father Time got around on his route to their neighborhood.

There are certain facts which must be taken into account in the life of any corporation or plant and if these are not included, or recognized, there is always but one result, which comes sooner or later—loss.

Does your butcher wear an apologetic smile when he asks you 30 cents a pound for steak? Does the grocery man think he is robbing you as he spoils nearly a dollar for a pound of butter? Does the baker cringe before your relentless accusing eye when he hands you out a loaf of bread for ten cents instead of five as formerly? Does the cigar man look scared when you observe that he has marked up the price of his stock to nearly double?

Neither he nor any of them do anything of the sort, so why should you, who are the real mainstays of modern business, be content to play a tin whistle in the great orchestra of life? Never in your life have you ever had, or hereafter will have, the opportunity which is now yours. Never again will the advanced level be possible of attainment with such a minimum of friction or effort.

You must attend to the foundation of your business at once or else the rising flood of prices will have you out on the roof calling for help pretty soon. Toot your horn for them to get out of the way instead of meekly standing in the side lines waving a flag of distress. An ossified man is never able to get a job except in a museum and then someone else draws the pay.

Take the price of wheat for your compass and map out your immediate course, with your final objective in sight, or else when the hour draws nigh for you to report to headquarters, you will be away out to sea in more ways than one.

If your board of directors should fail to back you up in your demand for better prices and better pay all around to meet modern conditions, do not let it be from a lack of proper enlightenment on the subject, including costs and conditions which must be met. You may think that the cross currents of the great world of trade will never stir the surface of your quiet little home pool in the backwaters of life, but it is a fact that the level of the home pool is the level of the greater body—and one cannot disturb the level of one without influencing the level of the other, so closely are our interests interwoven with those of the world's.

What, then, is the obvious thing for any manager to do? First, find out if he is running his plant so that there will be ample funds at all times on hand to replace his plant as fast as it depreciates or is destroyed from storms or other ravages of nature. Don't overdraw your depreciation account too far before replacing the balance due.

When you make insufficient allowance for depreciation, you overdraw your account just as though you overdrew at the bank; and in the end, it means about the same thing.

Keeping up necessary repairs is not taking care of depreciation by any means. If you are not taking care of repairs and paying current bills and in addition paying at least 6 per cent in dividends and 7 per cent in depreciation, you are not keeping even with the world as a going plant.

There will be a day of reckoning which will be hastened much by the rapid rise in taxes and increase in labor demands. When that day comes, it matters not how much your directors have told you to be economical and skimp along the best you can on the old rates, they will be the first to rise up in wrath and demand a change to a more efficient management. You will be the goat.

APHORISM: The wise man puts on his rubbers before his feet get wet.

Quarterly Meeting of Southern Indiana Telephone Men.

The Southern Indiana Independent Telephone Owners' Association held its quarterly meeting Tuesday, April 8, at the Homestead Hotel, West Baden, Ind. The meeting was presided over by President S. M. Isom, of Mitchell.

"Co-operation of State and District Association," was the subject of an address by M. E. Hosea, of Indianapolis.

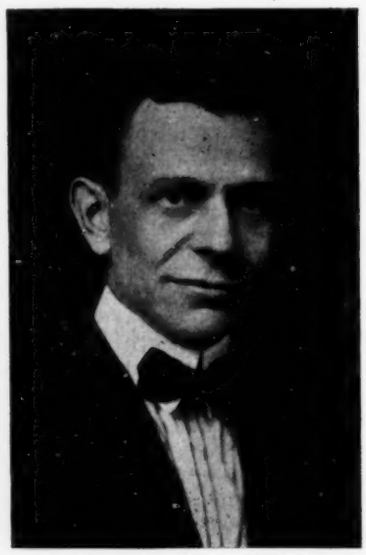
L. C. Griffitts, president Seymour Mutual Telephone Co., Seymour, Ind., was scheduled to speak on the "Corporation and Income Tax." However, he was unable to attend, so the subject assigned to him was discussed by various members.

"Just and Adequate Commission on Tolls" was discussed by Isom Ackerman, of the Loogootee Telephone Co., Loogootee, Ind., and "Anchors, Kind and Proper Use," by E. W. Swarthout, of Aurora, Ind.

A number of the members and visitors were called upon for a general discussion. Professor R. V. Achatz, of the Purdue University, made some remarks on the treatment of poles and benefits derived therefrom. J. K. Johnston, telephone engineer of Indianapolis, talked on methods of determining the rate of depreciation as applied to telephone properties. A number of other subjects were discussed, among them the service connection charge, after which the gathering adjourned. The next meeting will be held in West Baden, July 12.

Biographical and Personal Notes

Frank E. Bohn, who for several years has been assistant general manager of the Home Telephone & Telegraph Co., of Fort Wayne, Ind., has been appointed general manager of the company to succeed William L. Moellering, who has been acting as general manager in addition to his position as president of the company. Mr. Moellering asked to be permitted to resign as general manager in order to make it possible for him as president to devote his time and energy more fully to the many new problems which the company's increasing business is developing.



Frank E. Bohn, Recently Promoted to General Manager of the Home Company of Fort Wayne, Ind.

Mr. Bohn first became associated with the Home company of Fort Wayne in 1907. Three years later he was promoted to the position of assistant general manager, and in this capacity has served the company up until the present time. Mr. Bohn is a graduate of Williams College, Williamstown, Mass., and Purdue University, LaFayette, Ind.

A natural born leader and an enthusiastic booster for Independent telephony, Mr. Bohn has taken an active part in association affairs, both state and national, having served as president and secretary of the Indiana Independent Telephone Association. His many telephone friends wish him success in his new position with its added responsibilities.

Charles E. Koontz, manager and part owner of the Home Telephone Co., of Bremen, Ind., organized that company 20 years ago and commenced operations with 45 telephones. Since then, under Mr. Koontz' management, it has grown to a system of about 600 telephones.

Excellent business instincts, the ability to figure rapidly and a genuine interest in people generally and specifically, are characteristics of Mr. Koontz. While he keeps things pretty much to himself, he undoubtedly has lent a "helping hand" to many persons in need—that's his nature.

A sociable, friendly chap is "Charles E.," one who takes a real interest in what people have to say—and he remembers most of it, too, for he has a good memory, particularly of faces. And we think he could deliver a pretty good speech if he really tried.

Mr. Koontz is a pharmacist and still has a drug store in Bremen, which his brother operates, while he operates the telephone system—convincing evidence that the telephone game is more fascinating to him than the drug business.

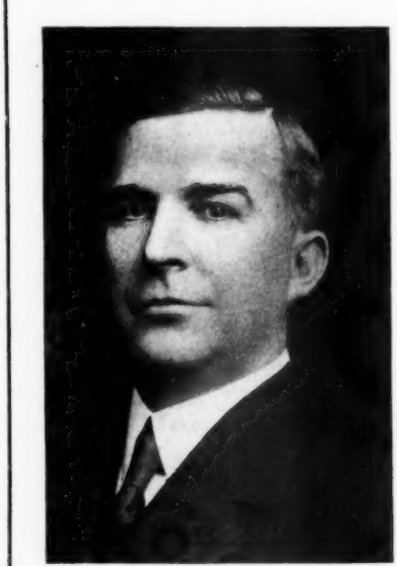
A native of Bremen, Mr. Koontz received his elementary education in the grade and high schools of that city. This was supplemented by a course at the Northwestern University.

He is a member of the Northern Indiana Independent Telephone Association and the Indiana Independent Telephone Association, and is a regular attendant at the conventions of the United States Independent Telephone Association. Mr. Koontz is now 55 years of age and if his looks are any criterion of his present state of health, we will hazard a guess that he will be attending telephone conventions for many years to come.

Charles E. Koontz, Manager and Part Owner of Home Telephone Co., Bremen, Ind.

Benjamin S. Read, of St. Louis, Mo., operating vice-president of the Southwestern Bell Telephone Co., has been elected president of the Mountain States Telephone & Telegraph Co., with headquarters in Denver, Colo., to succeed the late E. B. Field, Sr.

Mr. Read is a member of the staff of the Operating Board of the United States Telegraph & Telephone Administration, in charge of rate plans and miscellaneous commercial matters. He has been in the telephone business all his life, starting in as messenger boy in the office of the Cumberland company at Carthage, Tenn., 30 years ago.



Benjamin S. Read, Elected President of the Mountain States Telephone & Telegraph Co.

In time the messenger boy became local manager at Carthage. He was then transferred to the company's general offices at Nashville, and later made local manager at Owensboro, Ky. After some time he was transferred to New Orleans in the same capacity.

This position led to Mr. Read's becoming division superintendent for Mississippi and Louisiana and in March, 1912, he was again promoted, this time as general manager of the Bell Telephone Co. of Missouri, with headquarters in St. Louis. In November of that year he was sent to Kansas City as general manager of the Missouri & Kansas Telephone Co., and early in 1914 he returned to St. Louis as operating head of the Southwestern group of Bell companies, which position he has held up to the present time.

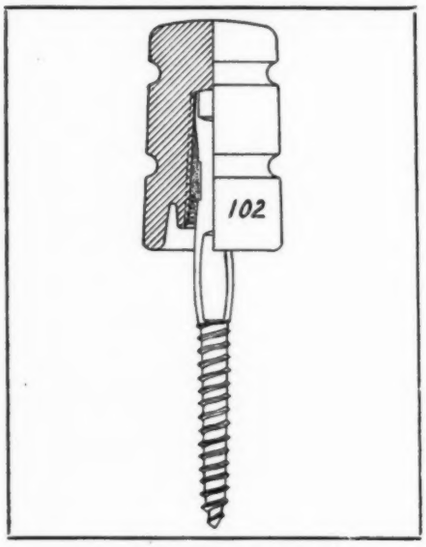
Mr. Read is a self-made man and has won his successive promotions through persistent efforts and plenty of hard work. Knowing the telephone game thoroughly, he is noted as an operating executive.

From Factory and Salesroom

Convention: U. S. Association, Chicago, June 24-26

Telephone Insulator For Rural Telephone Lines.

A telephone insulator which is especially adapted for rural lines, or for use in mines or forestry service, is shown in the accompanying illustration. It is manufactured by the Illinois Electric Porcelain Co., of Macomb, Ill., and is known as the No. 102 telephone insulator.



No. 102 Telephone Insulator.

It is 2½ inches in height and 1½ inches in diameter with two ¼-inch wire grooves. The galvanized lag screw, which is securely cemeted into the insulator, is flattened just below the insulator for engaging a wrench.

Finishing Metal Parts of Kellogg Apparatus.

Built of the highest grade material, and with standard parts, Kellogg telephones and switchboards are distinctive in appearance. In the matter of finishing metal pieces alone, the Kellogg Switchboard & Supply Co. has a large department filled with special machinery for the purpose of surfacing metal parts properly before enameling or copper or nickel plating. Some of these are called sand blasting machines.

One interesting type is a rectangular case with a small window in front, through which the operator can watch progress of the work. Here the metal bases of desk stands, for instance, are sand blasted before enameling. This sand is a special grade, and very fine particles are blown with great force upon the surface of the metal. This treatment not only removes every bit of rust or scale or loose particles, but gives an even, granular surface to which the special high grade enamel clings tenaciously.

With the use of the parkerizing process which prevents metal rusting under enamel, and with this careful preparation of the metal, it is stated that Kellogg enamel will not chip off because of rusting under its surface or because of loose scale of unevenness of texture of the steel to which it must cling.

The machines shown in the accompanying illustration are sand blast apparatus for various kinds of metal parts of Kellogg apparatus.

Paragraph.

JOHN HENRY SCHAPER, president of the Schaper Construction Material Co., of New York, recently celebrated the 40th anniversary of his entrance into the pole line hardware manufacturing business.

Skinderviken's New York Office.

The Skinderviken Telephone Equipment Co., of Chicago, has opened a New York office at 335 Broadway. E. Snider will conduct the affairs of this office, which will cover the Eastern states and foreign transactions. It is hoped that this will greatly facilitate the handling of inquiries and orders originating in such territory.

To Press Sale of Skinderviken Transmitter Button.

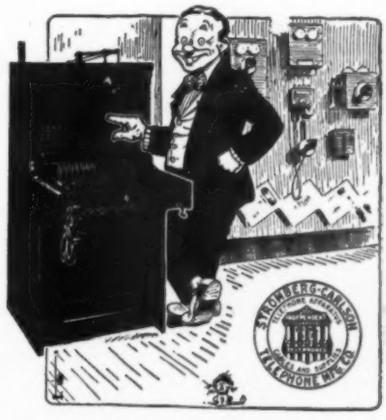
H. A. Bryant has severed his connection as traveling sales manager for the Skinderviken Telephone Equipment Co., of Chicago, and will engage himself independently in a similar capacity.

H. A. Bryant.

During the period in which Mr. Bryant represented the Skinderviken Telephone Equipment Co., he acquainted himself with the numerous merits of the Skinderviken transmitter button, and it is to the interest of the transmitter button that Mr. Bryant will devote his vigorous personality.

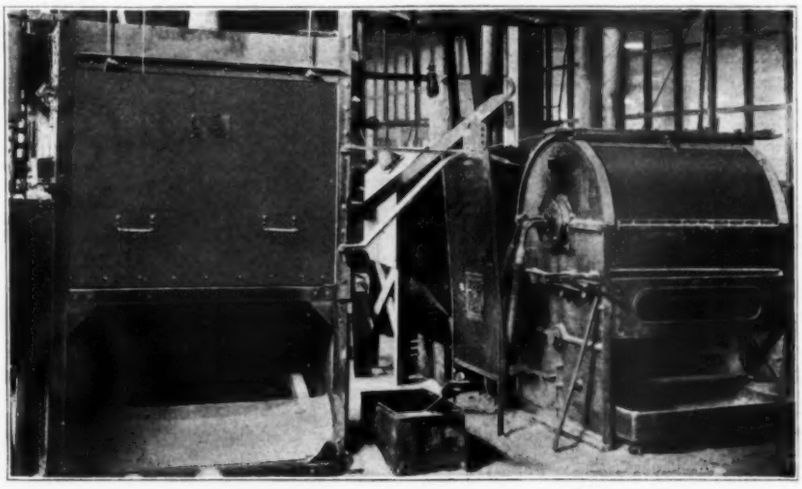
Stromberg-Carlson Blotter Calendar for April.

Phoney Bill is enthusiastic over the reception with which the No. 105 high efficiency switchboard is being met in the smaller telephone exchanges throughout the country. The accompanying reproduction from the April blotter calendar of the Stromberg-Carlson Telephone Mfg. Co. shows that he is unable to conceal his pleasure.



"The No. 105 High Efficiency Switchboard Brings Metropolitan Service to the Town."

"The No. 105 High Efficiency Switchboard brings metropolitan service to the town," says Phoney Bill and if space would have permitted on the blotter he would have added, "And if you don't believe it, ask any one of the many satisfied users."



Sand Blast Apparatus of Kellogg Switchboard & Supply Co.

Record of Telephone Patents

1,289,941. December 31, 1918; filed September 12, 1914. APPARATUS FOR LOADED TELEPHONE LINE SYSTEM; 16 claims; T. Shaw, Hackensack, N. J., and W. Fondiller, New York; assigned to Western Electric Co. The feature of this apparatus is a loading coil of generally toroidal form. Its magnetic core comprises a number of separate sections having a number of symmetrically arranged windings on them. Non-magnetic material is placed between the core sections while a clamp of non-magnetic material holds the windings and the core sections in position.

1,290,114. January 7, 1918; filed November 4, 1915. THERMIC TELEPHONE; nine claims; P. DeLange and R. A. Baron Van Lynden, Utrecht, Netherlands; assigned to Naamlooze Vennootschat de Nederlandsche Therm-Telephoon, Naatschatiji, Utrecht, Netherlands. A heating conductor support is mounted in the telephone casing in such a position that a sounding chamber is formed in front of the heating conductors. A sleeve having apertures at its top for the passage of sound waves is mounted on the telephone casing and adapted to slide longitudinally thereon, thereby varying the volume of the sounding chamber.

1,290,147. January 7, 1919; filed January 26, 1916. DEAD END FOR ELECTRIC AND TELEPHONE WIRES; two claims; H. Fairclough, Los Angeles, Cal. This dead end consists of a reversely-grooved insulating bob and a link arranged to form a bail and holder for the bob out of which the bob can be withdrawn only by spreading the limbs of the link apart.

1,290,148. January 7, 1919; filed February 27, 1908. AUTOMATIC TELEPHONE RELEASE; 26 claims; E. D. Fales, Western Springs, Ill.; assigned to Automatic Electric Co. A circuit is provided for maintaining the release relay of the automatic switch energized while the switch is searching for the trunk. Another circuit over the trunk, energizes the relay after the trunk is found and seized. Electromagnetic means are provided for making the relay slow-acting during the search for the trunk while automatic electrically-controlled means make it quick-acting after the trunk is seized.

1,290,616. January 7, 1919; filed March 30, 1917. AUTOMATIC SWITCHING APPARATUS OF TELEPHONE EXCHANGE SYSTEM; 11 claims; J. L. McQuarrie, Montclair, N. J.; assigned to Western Electric Co. A shaft is individual to each of the brushes of the switching mechanism. Two groups of contact strips are located on opposite sides of the brushes and shafts and a hinge supporting frame is provided for the contact strips.

1,290,621. January 7, 1919; filed August 3, 1915. RECORDING TELEPHONE; 15 claims; J. F. Malthaner, Atlanta, Ga. A phonograph is combined with the telephone transmitter to record conversations. A diaphragm carrying a stylus is associated with an electromagnet which is operated by direct current passing through the transmitter and the winding of the electromagnet.

1,290,645. January 7, 1919; filed May 7, 1917. SWITCHING MECHANISM FOR INTERCOMMUNICATING TELEPHONE SYSTEMS; 18 claims; T. H. Nelson, Chicago. In this selective switch, radially-arranged pairs of contacts for connection with the lines are connected through switch blades to a pair of concentric, contact rings. The rings are connected to the telephone set associated with the selective switch. A push rod operates the blades for connecting the contacts and the rings.

1,290,691. January 7, 1919; filed July 29, 1916. TELEPHONE LOCKOUT RELAY; four claims; F. W. Adsit, Chicago. This relay has two sets of coils, each set having a holding and an operating coil, and contacts are associated with each set of coils. Actuation of one set of coils opens one contact while actuation of the other set opens another contact; but actuation of both sets causes the contacts to remain closed.

1,290,808. January 7, 1919; filed October 30, 1917. COMPOSITE RINGING APPARATUS; eight claims; J. F. Toomey, New York City; assigned to American Telephone & Telegraph Co. A composite ringing set is included in a bridge shunted across the transmission line. Switching means are placed in the bridge between the line and the set to open the bridge and disconnect the ringing set from the line when better transmission is desired thereover.

1,290,822. January 7, 1919; filed December 26, 1911. AUTOMATIC TELEPHONE SYSTEM; 25 claims; C. S. Winston, Chicago; assigned to Kellogg Switchboard & Supply Co. In this selector switch an initial energizing circuit for a slow-release relay is adapted to be closed upon an energization of the primary relay of the switch. A substitute energizing circuit for the release relay includes normally-open contacts of the primary and release relays.

1,290,827. January 7, 1919; filed October 21, 1904. TELEPHONE SYSTEM; 10 claims: A. E. Keith, Hinsdale, Ill.; assigned to Automatic Electric Co. A trunking system between automatic suboffices and a central office is described where the trunks are less in number than the subscribers' lines connected to the sub-office.

1,291,111. January 14, 1919; filed October 6, 1915. SYSTEM OF DISTRIBUTION; 10 claims; J. F. Peters, Edgewood Park, Pa.; assigned to Westinghouse Electric & Mfg. Co. Automatic filtering means are designed to eliminate a selected harmonic component from a main electrical circuit having electrical periodic impulses impressed thereupon that vary within predetermined frequency limits and possess complex wave forms. This elimination is done irrespective of the frequency within the predetermined limits of the fundamental component of the impulses. The filtering provision is designed to eliminate disturbances in adjacent communication lines.

1,291,169. January 14, 1919; filed May 7, 1917. TELEPHONE RECEIVER REST; two claims; E. F. Ruggles, Brooklyn, N. Y. This receiver rest is formed from a single piece of material and designed to be clamped on the desk stand standard between the receiver hook and the transmitter. It is so shaped that the receiver is held in proper position at the ear when a person uses the telephone.

1,291,281. January 14, 1919; filed January 25, 1915. TELEPHONE WRITING TABLET; three claims; W. E. Upson, Lockport, N. Y. A tablet-holding arrangement for attaching to desks stands is described. It consists of a flat desk portion at one end of which is a pair of arms between which is mounted a spindle carrying a roll of paper adapted to be unrolled over the desk portion. The desk portion is secured to the pedestal of the stand portion in such a position as to be inclined to the horizontal.

1,291,499. January 14, 1919; filed June 27, 1917. TELEPHONE ATTACHMENT; one claim; E. Harter, Chicago. A support for holding a pack of writing sheets on the base of a telephone stand is described. The support is clamped at the lower end of the standard and extends at an incline over the base of the desk stand.

1,291,585. January 14, 1919; filed December 2, 1910. TELEPHONE TRUNKING SYSTEM; 45 claims; T. G. Martin, Chicago; assigned to Automatic Electric Co. This combined trunk selector and repeater for three-wire automatic systems is provided with mechanism which is automatically operative to intermittently ground the selected trunk upon the completion of the operation of the connector, to control the ringing mechanism to intermittently signal the called party.

1,291,586. January 14, 1919; December 10, 1910. TRUNKING AND SUPERVISORY SYSTEM; 32 claims; T. G. Martin, Chicago; assigned to Automatic Electric Co. In this automatic system a combined automatic trunk selector and impulse repeater, common to the subscriber's lines, is provided with means for automatically grounding the vertical side of any selected trunk to signal the called party. Provision is made for controlling the selector and repeater over two sides of a line circuit in series.

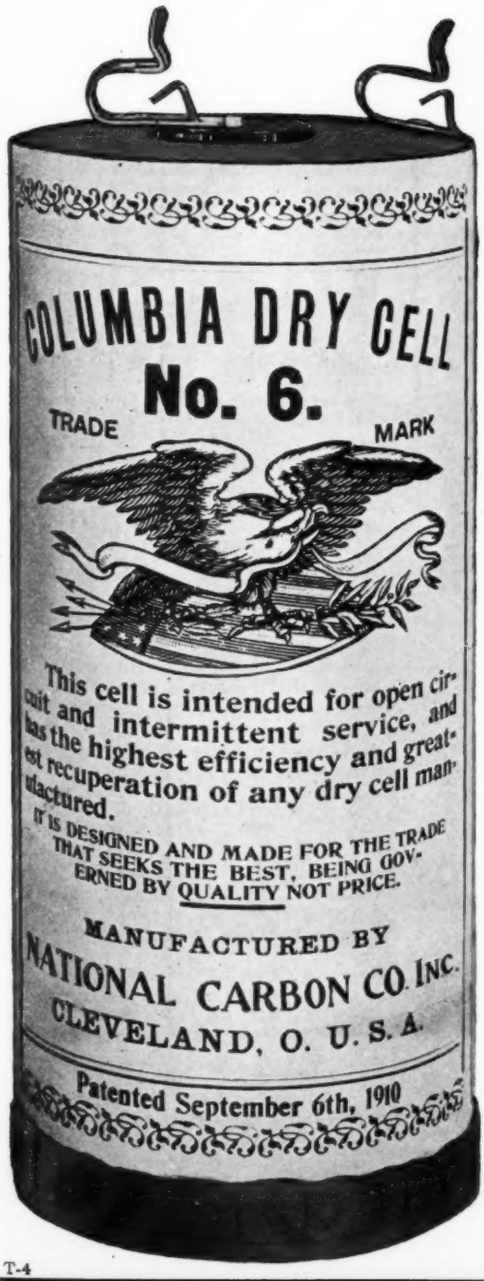
1,291,587. January 14, 1919; filed January 3, 1911. TWO-WIRE PARTY LINE LOCKOUT TELEPHONE SYSTEM; five claims; T. G. Martin, Chicago; assigned to Automatic Electric Co. In this automatic system a relay is bridged across the party line at each of the subscribers' stations. Provision is made for only momentarily energizing one of the relays upon the removal of the corresponding receiver from its hook. The relay controls means for closing the talking circuit while means outside of the central station are provided for preventing the relay from energizing when a receiver is removed from its hook and the line is busy.

1,291,731. January 21, 1919; filed November 22, 1916. CALL RECORDING APPARATUS FOR TELEPHONES; 12 claims; C. E. Bedaux, Grand Rapids, Mich. In this equipment when the calling apparatus is operated, a movable member is simultaneously moved. A movable member is operatively connected with a marker which, in turn, marks upon a markable element. Clockwork is adapted to move the markable element and provision is made for stopping the clockwork and releasing it by the calling apparatus.

1,291,766. January 21, 1919; filed April 24, 1917. TELEPHONE EXCHANGE SYSTEM; 29 claims; H. P. Clausen, Mt. Vernon, N. Y.; assigned to Western Electric Co. In this manual common battery system, an electromagnetic signal control mechanism is common to the cord circuits. An individualizing device is provided for each cord circuit for rendering the common signal control mechanism individual to any one of several engaged cord circuits. Mechanism responsive to the closure and subsequent opening of an engaged telephone line co-operates with the individualizing device of the corre-

Columbia Telephone Cell

"less cost per day of service"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sponding engaged cord circuit to connect the signal control mechanism thereto to the exclusion of other engaged cord circuits.

1,291,831. January 21, 1919; filed June 22, 1917. ELECTROMAGNET; six claims; O. M. Glunt, Rutherford, N. J.; assigned to Western Electric Co. The adjustment of the armature of this ringer to the pole pieces is easily obtained and remains permanent in service. The opposite ends of the armature bridge are bent toward each other to engage the ringer cores, while spring rings co-operate with grooves in the cores to position the armature bridge with respect to the cores.

1,291,894. January 21, 1919; filed April 26, 1917. REGISTERING SYSTEM; six claims; H. Hovland, East Orange, N. J.; assigned to Western Electric Co. A series of common relays is responsive to the impulses from a variably operable impulse-transmitting device associated with the telephone line. A register switch is positioned in accordance with the operation of the counting relays to selectively control other devices.

1,291,911. January 21, 1919; filed March 20, 1916. TELEPHONE TRANSMITTER; 16 claims; A. R. Kahl, Withington, Manchester, England. A lead ring is secured to a sheet metal front plate and a diaphragm pressed against the ring. A variable resistance element is mounted between a bridge carried by the front plate and the diaphragm, the ring being held in place in the front plate by compression of the material in the ring. This construction is designed to improve the purity of tone.

1,291,942. January 21, 1919; filed May 19, 1917. VIBRATORY CONVERTER; nine claims; O. M. Leich, Genoa, Ill.; assigned to Leich Electric Co. This frequency changer has a pair of rectifier vibrators which vibrate in synchronism with the alternations of alternating current supplied by a source of alternating current with which the frequency changer is equipped. Each of the vibrators has corresponding movable and stationary contacts. The contacts of the vibrators are maintained at opposite polarities. A consumption circuit has its continuity conjointly controlled by the rectifier vibrators and the pole changer vibrators.

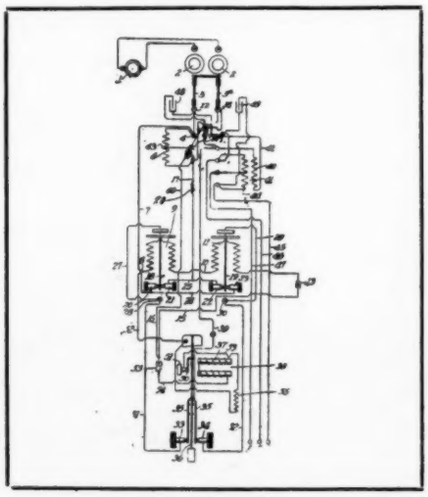
1,291,950. January 21, 1919; filed June 27, 1912. AUTOMATIC TELEPHONE REPEATER; 18 claims; W. A. Long, Sioux City, Iowa; assigned to Automatic Electric Co. In this system the trunk line is divided into two sections having a repeater for repeating impulses from one section to another. The repeater includes a relay responsive to impulses of variable duration received over one section of the trunk. One of the windings of a pair of windings of an induction coil is controlled by the relay for the purpose of inducing a current in the other of the windings. A second relay is controlled by the induced current for transmitting impulses of uniform duration over the other section of the trunk.

1,291,959. January 21, 1919; filed September 11, 1916. FINDER STARTER SYSTEM; six claims; A. E. Lundell, New York; assigned to Western Electric Co. In this automatic system provision is made to start a finder to select a desired group of substation lines and to search for a calling line in the desired group upon the initiation of a call. Other means move a second finder into a position to be started. It is started in search of a second calling line in the group as soon as it has moved into the position to be started.

1,291,960. January 31, 1919; filed September 22, 1916. NUMBER INDICATING SYSTEM; eight claims; A. E. Lundell, New York; assigned to Western Electric Co. This system is designed for use in exchange systems having machine switching. A combination of fast and slow-acting relays is located at a final connecting operator's position to control means for indicating the number of a called line. The relay combination, in turn, is controlled by impulses of varying lengths received over the trunks.

1,291,978. January 21, 1919; filed April 27, 1918. AUTOMATIC SWITCH; 11 claims; J. L. McQuarrie, Montclair, N. J.; assigned to Western Electric Co. In this switch a brush shaft carries a set of brushes arranged to co-operate with sets of stationary contacts. The shaft is rotated about an axis at right angles to the axis of the shaft in a first selective movement. It is moved in the direction of its axis in a second selective movement and rotates about its axis in a third selective movement to engage the set of brushes with a set of stationary contacts.

1,291,990. January 21, 1919; filed October 11, 1909. TWO-WIRE ROTARY CONNECTOR TELEPHONE SYSTEM; 85 claims; T. G. Martin, Chicago; assigned to Automatic Electric Co. A moving contact member is provided for a line-switching device having line terminals and a group of trunk terminals. Automatic means step the contact member to any of the line terminals or the first trunk terminal. In case the first trunk is busy, the member is stepped to a terminal of an idle trunk line. The switching device is operated over a circuit including both sides of any one of the lines in series and passing through the subscriber's telephone instrument.



No. 1,292,815.

1,292,003. January 21, 1919; filed May 25, 1917. ELECTROMAGNETIC DEVICE; three claims; D. D. Miller, New York; assigned to Western Electric Co. This relay has a hollow stationary core comprising a magnetic section and a non-magnetic section with a tube surrounding the section. A magnetic plug is located at each end of the tube and a movable plunger is secured to one of the plugs by means of a retractile spring and is movable toward the other of the plugs to bridge the non-magnetic section, thus providing a complete magnetic circuit upon the operation of the armature.

1,292,206. January 21, 1919; filed May 26, 1916. MAGNET CORE; eight claims; J. C. Woodruff, New York; assigned to Western Electric Co. This magnet core for loading coils and other electrical apparatus is composed of finely-divided iron particles. A coating of some other metal is placed on the particles, the coated iron particles being separated by insulating material.

1,292,207. January 21, 1919; filed December 10, 1915. BUZZER; three claims; J. A. Wotton, Montclair, N. J.; assigned to Western Electric Co. The armature of this relay is pivotally mounted on a pole piece with its free end in position to vibrate between the pole piece and an angular extension thereof and to make mechanical contact with both the extension and the pole piece, thereby producing an audible tone.

1,292,208. January 21, 1919; filed October 2, 1915. TRANSMISSION SYSTEM; four claims; A. Wray, Park Ridge, Ill.; assigned to Western Electric Co. A train-dispatching transmission system is described for connecting train dispatchers' offices with the various stations along the line.

1,292,257. January 21, 1919; filed April 9, 1917. MULTI-OFFICE TELEPHONE EXCHANGE SYSTEM; 11 claims; E. H. Clark, New York; assigned to Western Electric Co. The number of a called line is automatically indicated at a final connecting operator's position. A combination of relays controls the indicating means and the relays are successively actuated to cause the indication of the various digits of the number of the called line.

1,292,465. January 28, 1919; filed November 28, 1913. AUTOMATIC TELEPHONE SYSTEM; 65 claims; H. E. Hershey, White Water, Kans; assigned to Automatic Electric Co. The feature of this system is a mechanism common to a number of the connectors which is adapted to operate the shaft and wipers for establishing connection with a line and then being adapted to be disconnected from the connector as soon as the called subscriber answers.

1,292,499. January 28, 1919; filed February 12, 1917. AUTOMATIC TELEPHONE SYSTEM; 12 claims; T. G. Martin, Chicago, and E. Jacobsen, Evanston, Ill.; assigned to Automatic Electric Co. In this system a pole-changing relay in the connector is operable intermittently to set up the flow of alternating current from a source of direct current over the called line for signaling purposes. The pole-changing relay is rendered inoperative upon the response of the called subscriber.

1,292,522. January 28, 1919; filed November 10, 1913. SEMI-AUTOMATIC TELEPHONE SYSTEM; 49 claims; M. Schwartz, Los Angeles, Cal.; assigned to Automatic Electric Co. Inductive means separate the calling side of the extending trunk from the called line. A bridge across the calling side of the trunk controls means when the bridge is open, to release the connector switch

1,292,815. January 28, 1919; filed September 28, 1915. VIBRATORY CONVERTER; six claims; O. M. Leich, Genoa, Ill.; assigned to Leich Electric Co. In this converter a pair of twin vibrators vibrate in synchronism with the alternations of the alternating current and are adapted to supply uni-directional current to a consumption circuit. Each of the vibrators has a vibratory element and co-operating contacts associated with the opposite sides of the source of alternating current, the elements representing each to each different polarities. A resistance is inter-

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posed between the contacts and the source of alternating current to prevent the establishment of a short circuit across the source of alternating current upon improper actuation of the elements.

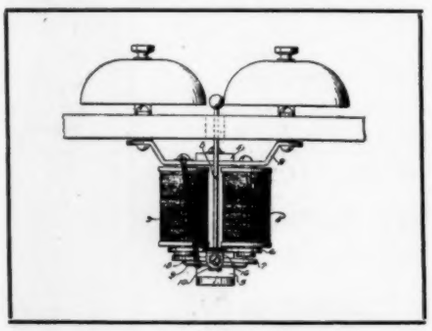
1,292,827. January 28, 1919; filed June 10, 1909. TELEPHONE EXCHANGE TRUNKING SYSTEM; 32 claims; F. Lubberger, Chicago; assigned to Automatic Electric Co. The feature of this automatic system is a relay for closing and holding closed the connection between the trunk conductor which is normally disconnected from the repeater and an impulse spring of the repeater, while the series of impulses are being transmitted by the repeater. The relay is de-energized during the talking.

1,282,828. January 28, 1919; filed August 16, 1916. SEMI-AUTOMATIC TELEPHONE SYSTEM; six claims; A. E. Lundell, New York; assigned to Western Electric Co. This system applies to a two-way trunk between the offices of a multi-office system. A trunk signal notifies the operator at the second office that a connection has been made with the trunk, the signal being automatically operated as a result of the taking of the trunk for use. Provision is made in the trunk circuit at the first office for preventing a false display of the signal if the operator at the second office is the first to disconnect.

1,292,839. January 28, 1919; filed July 14, 1918. TELEPHONE EXCHANGE SYSTEM; three claims; J. L. McQuarrie, Montclair, N. J.; assigned to Western Electric Co. In this signaling system for trunk circuits, a signaling device and a relay are associated with each trunk terminal, the relay operating upon the engagement of the associated terminal. An operator-controlled key is adapted when actuated to operate a common relay for the group of terminals, thereby operating all signaling devices associated with disengaged terminals.

1,293,060. February 4, 1919; filed January 4, 1918. TELEPHONE SYSTEMS; 21 claims; G. D. Edwards, East Orange, N. J.; assigned to Western Electric Co. The feature of this patent is the provision of means for varying the resistance of a telephone line upon the connection therewith of a telephone set so that the total line impedance is substantially unchanged. The efficiency of transmission between a number of connected stations is not materially affected by variations in the number of stations involved.

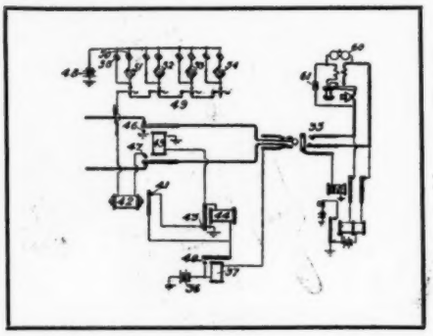
1,293,195. February 4, 1919; filed July 5, 1916. SWITCH CONTROL SYSTEM; seven claims; R. L. Quass, Hawthorne, N. J.;



No. 1,293,387.

assigned to Western Electric Co. In this automatic system, circuit-controlling apparatus comprises a plurality of contact devices consecutively operable at a definite rate. The timing device is governed by each contact device and an alarm signal is controlled by the timing devices.

1,293,387. February 4, 1919; filed December 15, 1916. ELECTROMAGNETIC SIGNALING DEVICE; 14 claims; C. J. Erickson, Chicago; assigned to Automatic Electric Co. The armature of this polarized ringer is supported on two flexible



No. 1,293,390.

arms of a U-shaped spring adjacent to the poles of the electromagnet. The armature may be adjustably moved relative to the stationary portion of the spring by flexing the flexible arms to vary the relation of the armature to the poles of the magnet.

1,293,390. February 4, 1919; filed March 11, 1915. TELEPHONE SIGNALING SYSTEM; four claims; S. H. Everett, Brooklyn, N. Y.; assigned to Western Electric Co. A signaling circuit is described for selectively connecting a source of intermittent signaling current of different frequencies with signals selectively responsive to the different signaling currents in accordance with the signal to be operated. A relay is provided for opening the signaling circuit upon response of the subscriber. The relay is inoperative by currents of the different frequencies but responsive to direct current alone or to direct current upon which is superimposed any of the different frequencies of alternating current.

1,293,415. February 4, 1918; March 6, 1915. TELEPHONE TRUNKING SYSTEM; 49 claims; B. C. Groh, Chicago; assigned to Automatic Electric Co. In this automatic toll switching system, the toll lines extending through a switching station terminate in manual connective terminals at a toll board. Operator's equipment is provided for interconnecting the toll lines manually by way of the terminals. Automatic switches at the switching station each comprise a movable terminal individual to a particular toll line and multiple fixed terminals of all the toll lines. A controlling circuit for each switch includes that portion of the associated toll line extending between the switching station and the toll board. Operator-controlled means actuate the switches over their respective controlled circuits to interconnect the lines automatically.

1,293,458. February 4, 1919; filed August 16, 1917. TELEPHONE CIRCUIT; eight claims; K. S. Johnson, Jersey City, N. J.; assigned to Western Electric Co. In this circuit the passage of direct current through the induction coil is opposed and substantially zero impedance offered to voice currents of any frequency. The use of an infinite capacity condenser is eliminated.

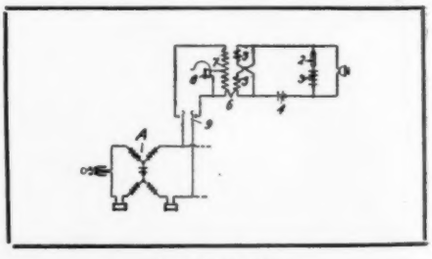
1,293,494. February 4, 1919; filed April 24, 1917. MACHINE SWITCHING TELEPHONE SYSTEM; seven claims; J. L. McQuarrie, Montclair, N. J.; assigned to Western Electric Co. The load factor of the system is increased by means of common trunks. A plurality of trunk bars are common to a plurality of switches, while a plurality of line bars are individual to each switch. A plurality of bars individual to each switch intersect the line and common trunk bars which carry multiple sets of terminals. Means are provided for rotating in a predetermined order a line and intersecting bar of a switch and a common trunk bar to bring a set of terminals on the line and on the trunk bar into engagement with multiple sets of terminals on the intersecting bar.

1,293,499. February 4, 1919; filed February 18, 1914. AUTOMATIC TELEPHONE SYSTEM; 24 claims; T. G. Martin, Chicago; assigned to Automatic Electric Co. The feature of this system is that trunking switches have their line wipers always in electrical connection with some one of the trunk lines, each trunk always the last one employed for extending a call therefrom. Provision is made for moving the switch to and fro over the trunks to select an idle trunk if the connected trunk is busy. A circuit interrupter, common to the switches, controls this movement of the switch.

1,293,545. February 4, 1919; filed July 24, 1917. CALLING DEVICE; nine claims; O. E. Rasmussen, West Hoboken, N. J.; assigned to Western Electric Co. In this calling device a stationary member carries symbols normally visible through the finger holes of a rotatable dial. Provision is made for locking the dial in a position to hide the symbols during the operation of an impulse-transmitting mechanism.

1,293,630. February 4, 1919; filed August 16, 1917. TELEPHONE EXCHANGE SYSTEM; 29 claims; G. Deakin, London, England; assigned to Western Electric Co. The feature of this automatic system is the provision of sets of mechanical stops for limiting the primary and secondary movements of the brush shaft. Electromagnetic means selectively position the stops while a sender is provided for controlling this mechanism.

1,293,825. February 11, 1919; filed April 6, 1918. TESTING SYSTEM; 10 claims; E. R. Lundius, Brooklyn, N. Y.; assigned to Western Electric Co. In this system for separately testing portions of telephone lines, an operating circuit is established upon the connection of a plug-ended extension circuit of a telephone line with either of two jacks in which a trunk circuit terminates at a switchboard. Two relays in the operating circuit are responsive to the connection of the plug with one jack to open the telephone line and disconnect one end thereof from the trunk circuit. A resistance is included in



No. 1,293,458.

the operating circuit when the plug is connected with the other jack whereby but one relay is responsive to cause the opening of the telephone and the disconnection of the other end thereof from the trunk circuit.

There are several reasons for WARNER POLE CHANGERS

that should appeal strongly to you when making a selection.

1. The Warner was the first successful pole changer made.
2. Over twenty-five thousand are in use today.
3. Always on the job; last a life-time.
4. No pole changer on the market is as simple in construction.
5. The most economical signalling apparatus manufactured. Only draw current when signalling.
6. Produces both alternating and pulsating current.

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Warner Electric Company—Muncie, Ind.

The "French" FOLDING DOOR Telephone Booth

Patent Granted—Feb. 11, 1919

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Note the Exclusive Features of "RIMCO" RUBBER INSULATED PLIERS

Every pair is tested and passed for 10,000 volts at the Electrical Testing Laboratories of New York City, and bears a certified tag to that effect.

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Condensed Telephone News

Officers of Companies Are Urgently Requested to Forward to Us Promptly All Financial and Other Statements as Soon as Issued and Any Items Relating to Construction, Rebuilding, or Changes in Their Plants and Systems

New Telephone Companies and Incorporations.

SCHULINE, ILL.—Articles of incorporation have been filed by the Schuline Telephone Co. with $2,000 capital stock. The incorporators are S. E. Gilmour, R. S. Ricket, W. J. Ricket and R. L. Mines.

WEST LIBERTY, KY.—Articles of incorporation have been filed by the West Liberty Telephone Co. with $10,000 capital stock. The incorporators are C. D. Arnett, W. M. Gardner and Evert Mathias.

FOLEY, MINN.—Articles of incorporation have been filed by the Foley Rural Telephone Co. The company is capitalized at $2,500 and its officers are as follows: President, L. E. Henry; vice-president, J. P. Kampa; secretary-treasurer, Edward Henry, all of Foley.

RYEGATE, MONT.—The Public Service Telephone Co. has been incorporated with $50,000 capital stock by L. W. Loy, F. D. Firehammer, W. A. Stewart, G. H. Corrington and H. W. Newton.

MELBERN, OHIO.—The Melbern Telephone Co. has been incorporated with $4,000 capital stock by Edwin Stenger and others.

COLE, S. D.—The Cole-Hettinger Telephone Co. has been incorporated with $10,000 capital stock by C. D. Barrett and Charley Meink, of Cole, and Sumer Sand, of Hettinger.

ETHAN, S. D.—The Farmers Western Telephone Co. has been incorporated with $2,500 capital stock by G. C. Reimnitz, Ernest Herbst and E. T. Wieczorek, all of Ethan.

NOWLIN, S. D.—The Nowlin & Ottumwa Telephone Co. has been incorporated with $1,000 capital stock by H. S. Shafer, of Ottumwa, H. W. Morris and E. K. Coshum, treasurer, of Nowlin.

OKATON, S. D.—The Farmers Mutual Telephone Co. was organized recently and the following officers elected: Thomas Stropple, president; H. J. Skinrood, vice-president and W. F. Kennedy, secretary and treasurer.

COLONIAL BEACH, VA.—The Stratford Telephone & Telegraph Co. has been incorporated with $10,000 capital stock. George Mason, of Colonial Beach, is president of the company and William Wilson, of Oak Grove, secretary.

Financial.

DAMASCUS, OHIO.—The Damascus Telephone Co. has increased its capital stock from $50,000 to $100,000.

BRODHEAD, WIS.—The Brodhead Telephone Co. has increased its capitalization from $15,000 to $50,000.

Construction.

ST. PAUL, MINN.—Miles of new telephone lines will be built this year at township expense in Northern Minnesota forests to increase fire protection according to an announcement made by W. T. Cox, state forester, who approved tax levies for that purpose in two townships north of Ray in Koochiching county, which made a total of 20 projects approved this year.

Elections.

INDIANAPOLIS, IND.—William Fortune was re-elected president of the Indianapolis Telephone Co. at the recent meeting of the board of directors. Louis Hollwek was re-elected vice-president, and Foster V. Smith was re-elected secretary and treasurer.

The members of the executive committee are William Fortune, Louis Hollweg, F. D. Stalnaker, A. A. Wilkinson and F. R. Huntington. E. L. Cline will continue as general manager and F. V. Newman, engineer, will continue as assistant to the president. E. V. Haines is the general auditor for the company.

Prior to the election of officers the stockholders of the company elected the following directors: William Fortune, Louis Hollweg, John H. Holliday, J. K. Lilly, Frank D. Stalnaker, L. C. Huesmann, A. A. Wilkinson, Harry S. New, John N. Carey, Bowman Elder, Ralph A. Lemcke, and Foster V. Smith, of Indianapolis; F. R. Huntington and C. Y. McVey, of Columbus, O., and Frederick W. Stevens, of Ann Arbor, Mich.

HOLDINGFORD, MINN.—Stockholders of the Holdingford Telephone Co. held their annual meeting recently and elected officers and directors for the ensuing year as follows: President, Alex Lemmer; vice-president, Anton Streit; secretary and treasurer, J. B. Klasen; directors, Fred Widman, Anton Ruf, John F. Heinz and Nick Wolney.

PALMYRA, MO.—At a recent meeting of the Palmyra Telephone Co. the following officers were elected: Geo. W. Pine, president; T. C. Lasley, vice-president; F. T. Staton, manager. The officers together with E. Frazer and L. C. Hendren constitute the board of directors.

OPPORTUNITIES

(Continued from Page 43)

FOR SALE—Rural and village exchange; Kellogg switchboard; 135 subscribers. Plant in good condition. Address Oronoco Telo. Co., Oronoco, Minn.

FOR SALE—All or part interest in telephone exchange at Covington, Okla., in an oil field. Come and investigate. Address Covington Telo. Co., Covington, Okla.

FOR SALE—Telephone exchange of 300 telephones. Own all toll lines in exchange. Located in good country. Five years old. Must sell at once. Address S. B. Callaham, Broken Bow, Okla.

FOR SALE—Telephone system 200 stations; electric light system 50 meters; income $4,700. Cash, part terms; or would consider good farm land in trade. Lancaster Telephone Co., Lancaster, Kans.

FOR SALE—An Iowa telephone exchange, 250 stations and switch for 300 rural subscribers; no stiplated rate in franchise; a money-making proposition. Address 3604, care of TELEPHONY.

FOR SALE—Telephone exchange, 325 telephones. Fine condition. No competition or free tolls. Income $6,000.00. McLouth Telephone Co., McLouth, Kans.

FOR SALE—Exchange in southeast Kansas. 145 subscribers. 150 rural phones switched. Good proposition for one man. Address 3620, care of TELEPHONY.

FOR SALE—Exchange of 360 stations. Middletown Telephone Co., Middletown, Indiana.

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They put it off and put it off—just as *you* have done—but now they've started and they're going right to it *quick*.

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